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WAR MACHINE

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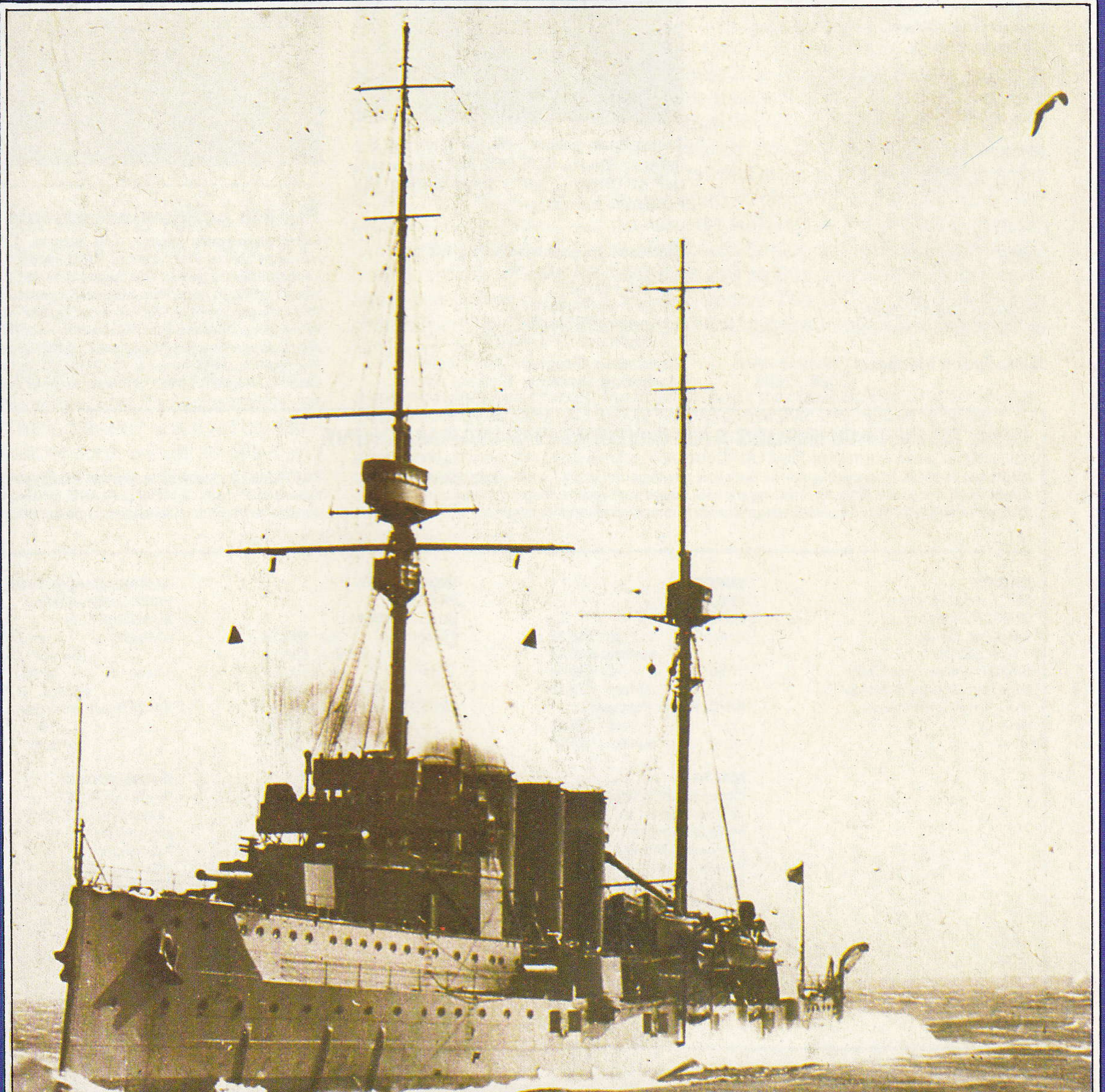

A fully illustrated guide to Armoured Cruisers of World War I

WAR MACHINE

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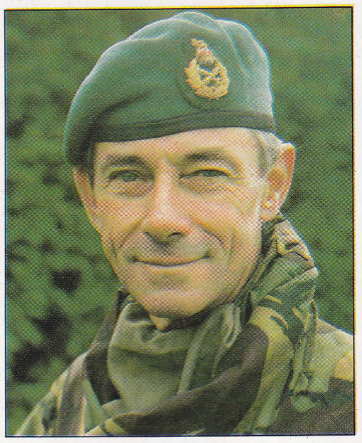

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Armoured Cruisers of World War 1

HMS Hampshire *was one of the six-strong 'Devonshire' class of armoured cruisers built between 1902 and 1905.*

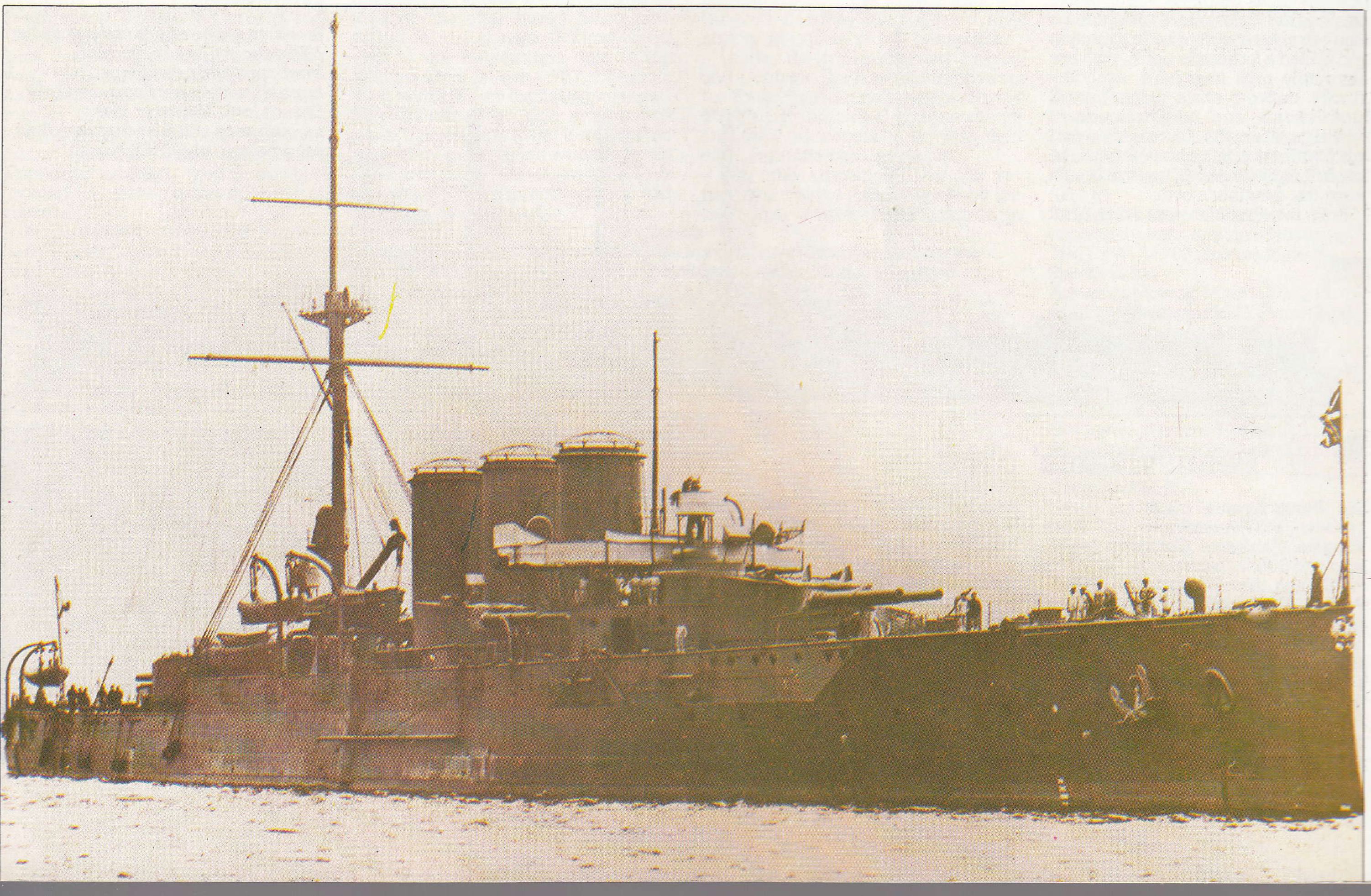
Six years before the outbreak of World War I the battle-cruiser was introduced. Too slow to intercept their lighter brethren but too weak to stand in the line of battle, armoured cruisers nevertheless fought throughout the war.

As a type, the armoured cruiser was reckoned obsolete by 1914, its development having been halted abruptly by the introduction of the battle-cruiser in 1908. In fact, the latter was initially referred to as an 'armoured cruiser' but this was a ploy to disguise its true nature. It outclassed the older type so conclusively that its qualities put it in another bracket entirely and it could be argued that, if used with common sense, the more traditional armoured cruiser could still have had a role complementary to that of the battle-cruiser. Had this been the case, evolution would probably have taken the better qualities of each and fused them into a third, and probably more healthy, type. War, however, has a habit of interrupting normal evolutionary processes.

The origins of the armoured cruiser go back to HMS *Shannon* of 1877 and, therefore, almost to the introduction of the ironclad itself. Clearcut categories such as 'battleship' and 'cruiser' did not exist in modern terms and, for long, an armoured cruiser was reckoned on a par with a third- (or even second-) class battleship, with protection and armament reduced in scale for the benefit of speed. The indifferent quality of contemporary armour plate still, however, meant enough weight to offset any effective gain in speed. To the Royal Navy they were a failure, banished as flagships to distant imperial stations and the type was discontinued. Only with improvements in armour could the class be resurrected with a view to discharging its designed functions of reconnaissance in force, support for smaller friendly cruisers, frustrating the aims of the enemy's cruisers and finishing damaged ships of superior size.

Upon the advent of the battle-cruiser these aims should have been modified as, in a fleet context, they tended to throw the armoured cruiser at the very ships that were designed to destroy it. That this was not recognized led directly to the disaster suffered by Arbuthnot at Jutland. Coupled with Coronel and the Falklands battles and a very high loss rate from a variety of other causes, this led to the armoured cruiser once again being banished to trade protection. The UK had disposed of its remaining 19 hulls by 1922, but the type lingered in the fleets of France, Italy and the USA.

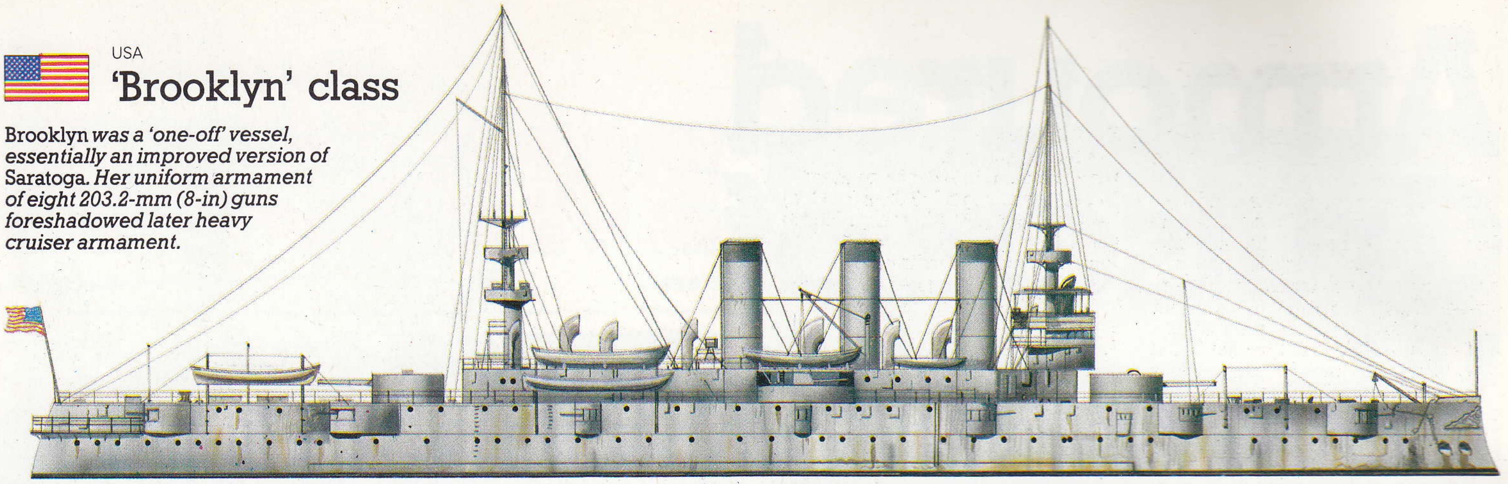
A classic armoured cruiser, the Russian Rurik *was built by Vickers; her design incorporated the lessons of the Russo-Japanese war. She carried a heavy armament of four 254-mm (10-in) and eight 203.2-mm (8-in) guns and her defensive protection included a 152-mm (6-in) belt, armoured magazines and torpedo defence.*



USA

'Brooklyn' class

Brooklyn *was a 'one-off' vessel, essentially an improved version of* **Saratoga**. *Her uniform armament of eight 203.2-mm (8-in) guns foreshadowed later heavy cruiser armament.*



Though a 'one-off', the single **'Brooklyn' class** ship USS ***Brooklyn*** launched in 1895 had a profile so distinctive that she is probably the best-remembered American armoured cruiser. She was an improved version of the USS ***New York*** (later ***Saratoga***) of four years earlier though, in truth, neither was more than a protected cruiser with a very shallow belt running only the length of the machinery spaces. This lack of depth was possible largely because of the low vertical height of the small reciprocating engines that were installed. The two shafts each had two prime movers, directly-coupled and arranged in tandem. Most cruising could be achieved on one engine to each shaft, making for economy and endurance, and foreshadowing the COGAG and CODAG arrangements in current practice.

Also prophetic was the armament mix, the eight 203.2-mm (8-in) and 12 127-mm (5-in) guns being typical of a ship four decades later. The earlier *New York* had had only six 203.2-mm weapons, twin turrets forward and aft, together with a single in a shield-protected barbette on each side amidships. With an increase in length of 6.1 m (20 ft) but none in the beam, the *Brooklyn*'s designers substituted a twin turret for each barbette mounting and added a forecastle deck. With her extremely high freeboard, exaggeratedly curved ends, pronounced tumblehome and tubular masts of varying section, the ship clearly owed much to French influences, though the three spindly funnels of unusual height were the designer's own.

Both the *Brooklyn* and *New York* participated in the Battle of Santiago de Cuba in 1898, the former as Schley's flagship. In the course of the Spanish-American War an inferior Spanish squadron, blockaded in the port, was forced out to avoid capture by land operations. Ineptly handled, they were destroyed by superior gunfire as they emerged, all ending as grounded, gutted wrecks.

Specification

'Brooklyn' class

Displacement: 9,215 tons standard and 10,100 tons full load

Dimensions: length 122.68 m (402.5 ft); beam 19.71 m (64.67 ft); draught 8.00 m (26.25 ft)

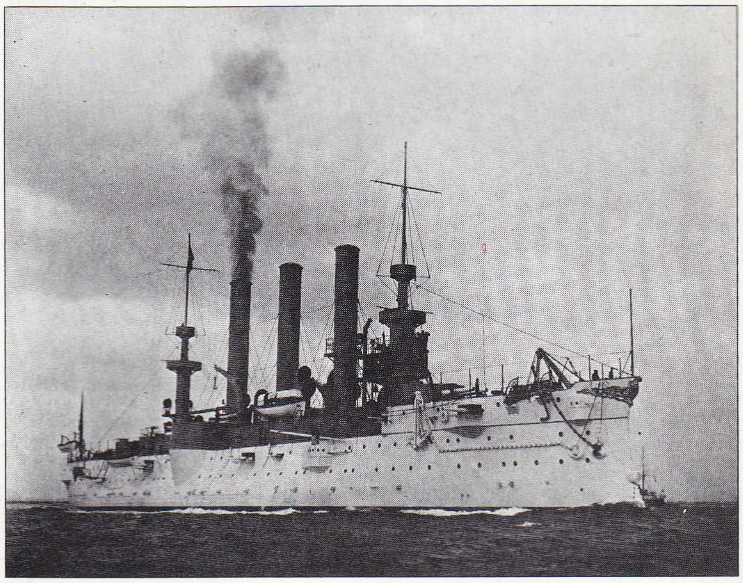
Propulsion: four sets of triple-expansion steam engines delivering 13795 kW (18,500 ihp) to two shafts

Speed: 22 kts

Armament: eight 203.2-mm (8-in), 12 127-mm (5-in) and 12 6-pdr guns, and five 457.2-mm (18-in) torpedo tubes

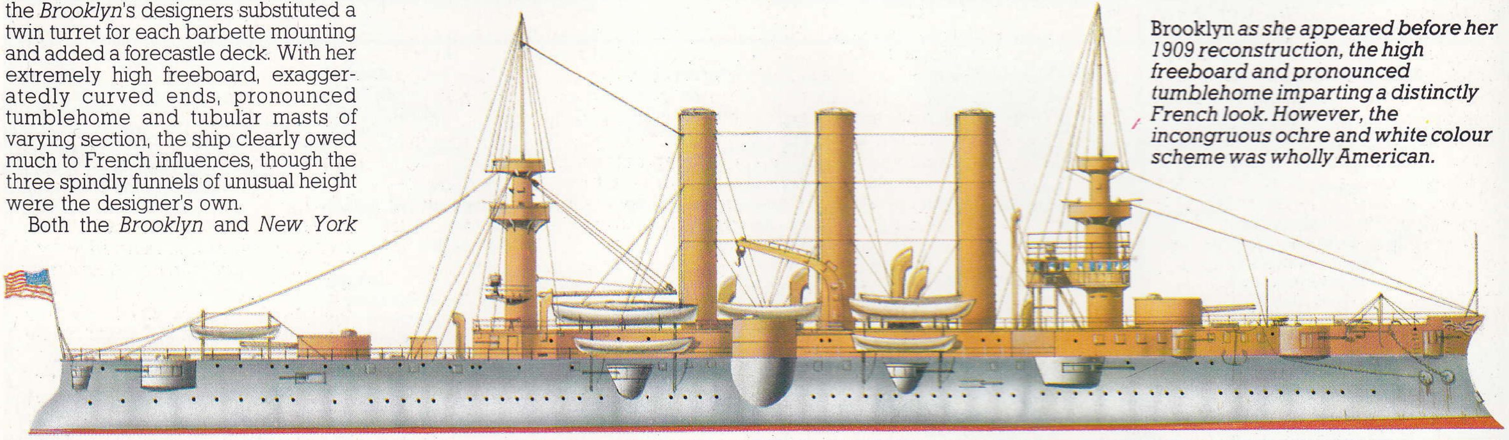
Armour: belt 203.2 mm (8 in) tapering to 76.2 mm (3 in); protective deck 152.4 (6 in) tapering to 76.2 mm (3 in); barbettes 203.2 mm (8 in); casemates 101.6 mm (4 in)

Complement: 718



Above: Brooklyn *was so lightly armoured as to almost warrant classification as a protected cruiser, having only a 76.2-mm (3-in) armour belt with no bulkheads at the ends. The low height of her reciprocating engines allowed the belt to be equally shallow.*

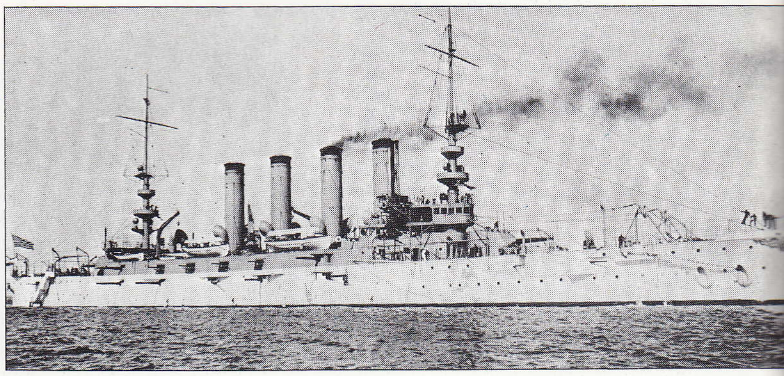
Brooklyn *as she appeared before her 1909 reconstruction, the high freeboard and pronounced tumblehome imparting a distinctly French look. However, the incongruous ochre and white colour scheme was wholly American.*



USA

'Pennsylvania' class

Six **'Pennsylvania' class** armoured cruisers (USS ***Pennsylvania***, USS ***West Virginia***, ***California***, ***Colorado***, ***Maryland*** and ***South Dakota***, later renamed ***Pittsburgh, Huntingdon, San Diego, Pueblo, Frederick*** and ***Huron***) were launched in 1903-4 and represented not only a great leap in sheer size but also a transition to European style of armament balance. They also typified the American love for completely symmetrical armament layout, a trait that continued right through to the various standard designs of World War II. For their size, their armament was on the light side in a vain attempt to reduce weight and improve speed to the European norm of 23 kts. This was because they (together with the follow-on 'Tennessee' class ships) were meant, like their British contemporaries, to be used as a fast wing of the main battlefleet. Though they were longer than



Displacing over 15,000 tons, the 'California' class were the first US armoured cruisers built on a European scale.

contemporary battleships, they had a common problem of inadequate speed margin.

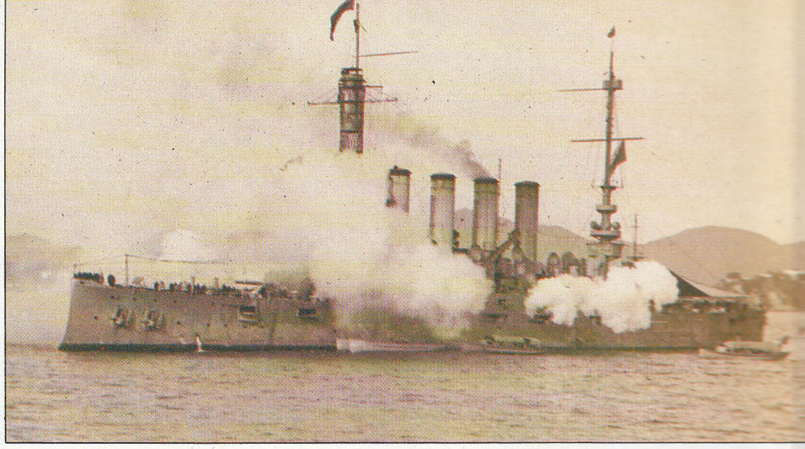
In terms of protection, the amidships armour, 127 mm (5 in) thick, rose sufficiently high to protect the 152.4-mm (6-in) casemates but was long enough only to cover the boiler and machinery spaces. Though 88.9-mm (3.5-in) belts extended both to bow and stern, these were very shallow and typically of the type that reinforced the British ideas that, unless it could effectively keep out 152.4-mm shell fire, its weight was better incorporated in the protective deck behind it.

War experience resulted in their armaments being considerably modified, 14-pdr AA guns being added and, in at least one case, an aircraft catapult being temporarily added. Most had their pole foremasts replaced by the 'basketwork' cage masts, which enabled their spotting tops to be considerably elevated without incurring a vibration penalty to upset the instruments, while also improving the visibility by being clear of the ship's smoke.

The *Pittsburgh* emerged from her mid-life refit with only three funnels, giving her the looks of a 'Connecticut' class battleship. Only one, the *San Diego*, was lost, running on a mine in home waters. The port machinery spaces flooded and, though steam was available, there was reluctance to counterflood the starboard spaces and the ship capsized.

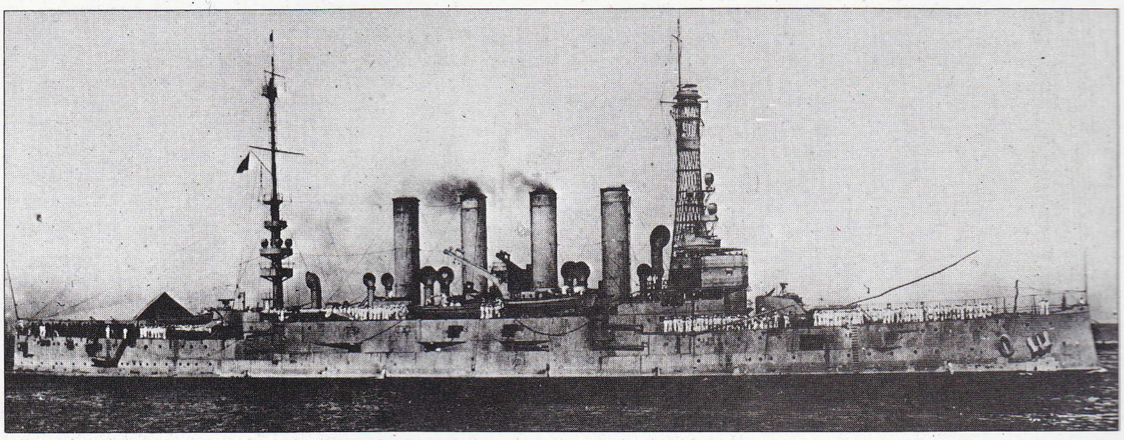
Specification

'Pennsylvania' class
Displacement: 13,700 tons standard
Dimensions: length 153.62 m (504.0 ft); beam 21.18 m (69.5 ft); draught 7.39 m (24.25 ft)
Propulsion: two sets of triple-expansion steam engines delivering 17151 kW (23,000 ihp) to two shafts
Speed: 22 kts
Armament: four 203.2-mm (8-in), 14 152.4-mm (6-in) and 18 76.2-mm (3-in) guns, and two 457.2-mm (18-in) torpedo tubes
Armour: belts 152.4 mm (6 in) tapering to 88.9 mm (3.5 in); transverse bulkhead 101.6 mm (4 in); protective deck 38.1 mm (1.5 in) with 101.6-mm (4-in) slopes; barbettes 152.4 mm (6 in); casemates 127 mm (5 in)
Complement: 829



Above: For their size, the 'Pennsylvannia' class were lightly armed, partly in an attempt to give them a good margin of speed over contemporary battleships.

Below: During the war Pittsburgh *acquired a basketwork cage foremast allowing spotting tops to be higher but without incurring a weight penalty.*



USA

'Tennessee' class

Four **'Tennessee' class** armoured cruisers (USS ***Tennessee***, USS ***Washington***, USS ***North Carolina*** and USS ***Montana***, later renamed ***Memphis, Seattle, Charlotte*** and ***Missoula***) were built, the last completed in 1908. Except for the underarmed Charlestons of 1904-5, no more of the type were built as a result of the introduction of the battle-cruiser. Like earlier armoured cruisers, they eventually yielded the 'state' names in favour of battleships.

In size and in armament the 'Tennessees' equated fairly to the contemporary British 'Warriors' though they carried also 22 14-pdr 76.2-mm (3-in) guns for use in repelling torpedo craft. A major difference as compared with the British ships was their bulk: like the French, the Americans believed in plenty of freeboard and, though six of each ship's 152.4-mm (6-in) guns were casemated on each side, they were sufficiently high to be fought satisfactorily. Above them, at upper deck level, four more 152.4-mm guns were set in casemates, one at each corner of the superstructure.

A feature of the Tennessees was their large expanse of armour plating. The main belt, 127 mm (5 in) thick, extended from before the forward turret to abaft the after turret, being continued in a shallower 76.2-mm (3-in) belt to the extremities, this being backed by a 0.91-m (3-ft) cofferdam filled with a 'water-excluding material'. The 127-mm (5-in) side armour was taken high enough to enclose all of the secondary guns, which were able, via re-entrant ports, to be stowed within its protection. The protective deck had 101.6-mm (4-in) slopes.

The main battery consisted of a twin 254-mm (10-in) turret at each end, the largest calibre carried by any armoured cruiser of this generation.

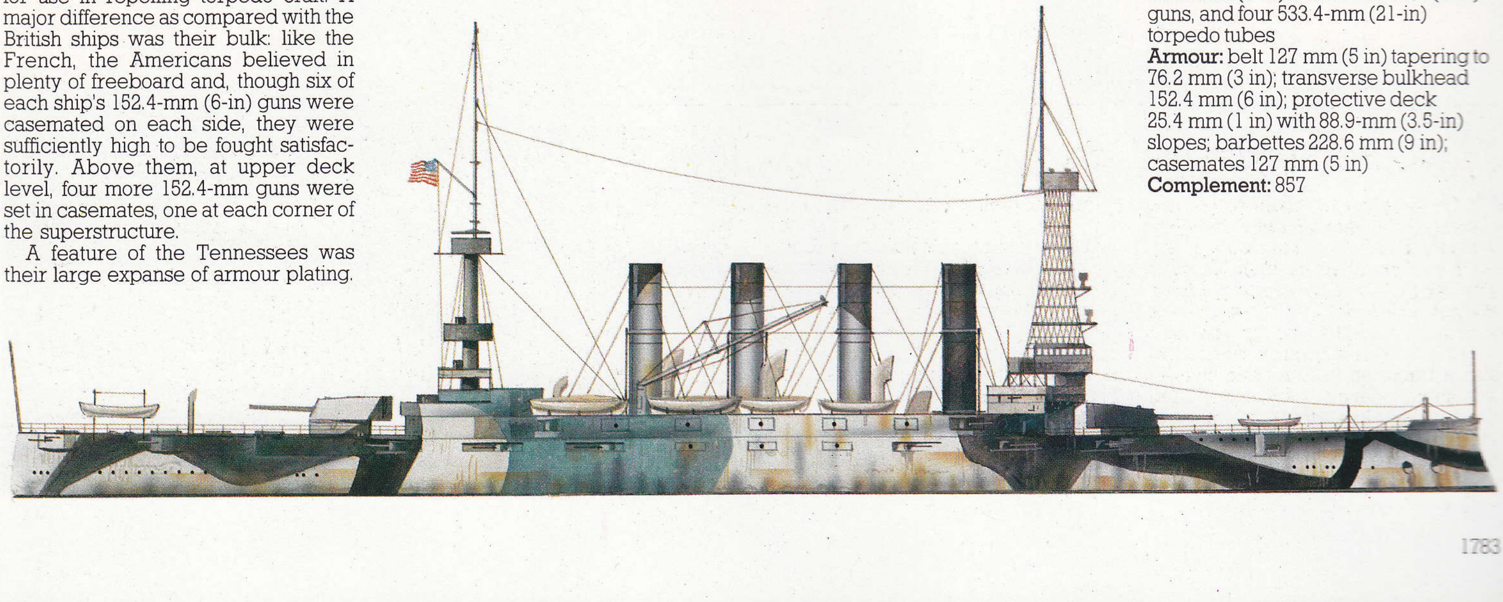
Unlike the triple-screwed French and Germans, the Americans followed the British twin-screw layout, with their engines in separate compartments and their 16 boilers in no less than eight separate compartments.

Wartime alterations saw the replacement of the foremast pole by the cage-type structure then common in American battleships, the landing of much of the secondary armament and the acquisition of aircraft catapults by two ships. The *Memphis* was the sole war loss of the class.

Specification

'Tennessee' class
Displacement: 14,500 tons standard
Dimensions: length 153.62 m (504.0 ft); beam 22.25 m (73.0 ft); draught 7.92 m (26.0 ft)
Propulsion: two sets of triple-expansion steam engines delivering 17897 kW (24,000 ihp) to two shafts
Speed: 22 kts
Armament: four 254-mm (10-in), 16 152.4 mm (6-in) and 22 76.2-mm (3-in) guns, and four 533.4-mm (21-in) torpedo tubes
Armour: belt 127 mm (5 in) tapering to 76.2 mm (3 in); transverse bulkhead 152.4 mm (6 in); protective deck 25.4 mm (1 in) with 88.9-mm (3.5-in) slopes; barbettes 228.6 mm (9 in); casemates 127 mm (5 in)
Complement: 857

The wartime camouflage of Tennessee *makes a dramatic change from the pre-war panoply of* Brooklyn. *The 'Tennessees' were the last armoured cruisers to be built by the USA.*



Jutland-Twilight of the Armoured Cruiser

The battle of the Falklands demonstrated that even the best armoured cruisers were no match for battle-cruisers, yet May 1916 found two cruiser squadrons scouting for the Grand Fleet. Under the impetuous Rear-Admiral Arbuthnot four vessels, **Defence, Warrior, Duke of Edinburgh** ***and*** **Black Prince,** ***steamed ahead to engage the German 2nd Scouting Group, but they were steering straight for the German line.***

At 18.00 on 31 May 1916 the Battle of Jutland was at a critical juncture. The long line of the German High Seas Fleet had been lured northward by Admiral Sir David Beatty's battle-cruisers and its head was only 21 km (13 miles) from Admiral Sir John Jellicoe's nearest battleship, within gunshot but hidden in the haze. But Britain's Grand Fleet was still steaming south east in cruising formation, six parallel columns of four ships, its commander-in-chief yet unable to deploy into battle line for want of firm information. His immediate 'eyes' were the 1st and 2nd Cruiser Squadrons, each consisting of four armoured cruisers, deployed on each forward wing of the fleet. Their task was to support the fleet and its light cruisers, to reconnoitre in force and to deal with enemy cruisers.

Aware of the need to prevent premature contact of the two fleets, Beatty at some cost barged across the head of the German line, forcing it from its near northerly course to about east. By this time the die was cast and the Grand Fleet was deploying correctly onto a battle line roughly paralleling that of the enemy. Between the two fleets the calm sea had been cut up by the manouevrings of both battle-cruiser forces and their attendant scouting groups of light cruisers. The already fickle visibility had deteriorated with the smoke from a hundred funnels.

On the nearer side to the enemy was the 1st Cruiser Squadron, under the spirited command of Rear-Admiral Sir Robert Arbuthnot. His flag was in HMS *Defence*, supported directly by HMS *Warrior*. Farther out was HMS *Duke of Edinburgh* with HMS *Black Prince* on the wing. Immediately before the Grand Fleet's deployment began, Arbuthnot signalled to the *Warrior* (timed 17.53) 'Open fire and engage enemy.' It is not known which of the enemy he had sighted; probably it was light cruisers of the German's 2nd Scouting Group at a point just before they were savaged by the guns of Rear-Admiral Sir Horace Hood's battle-cruisers.

Even as Jellicoe deployed, the German line remained invisible to him, with Beatty's battle-cruisers storming across his view. For his part, Beatty was aware of two British armoured cruisers (they were the *Defence* and *Warrior*) closing on his port bow and firing at an unknown target. He was more than surprised when the two held their course, passing close under his bows, forcing him to alter course and lose sight of the enemy line.

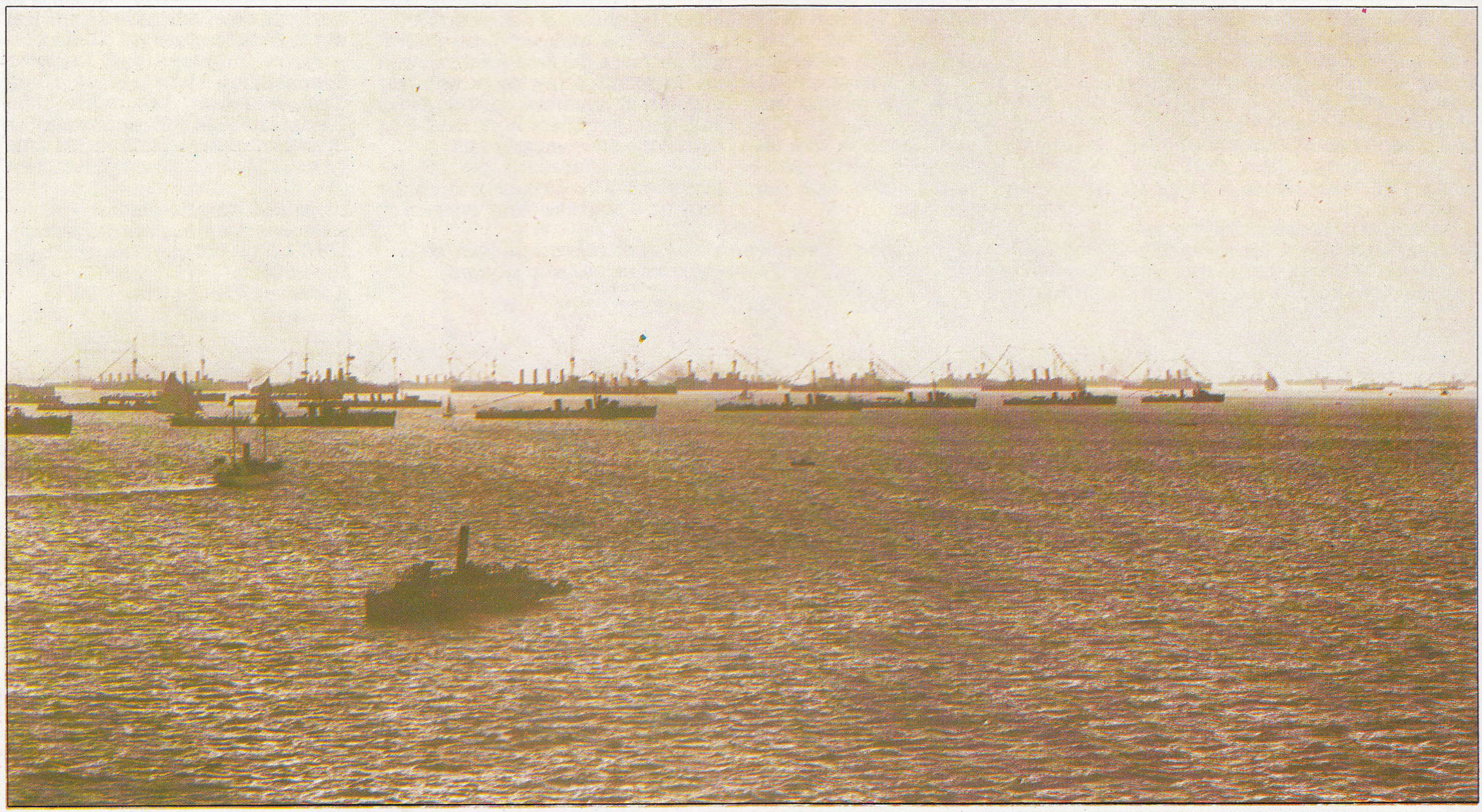
Arbuthnot was, at this stage, after SMS *Wiesbaden*, an enemy light cruiser that had been disabled just before by Hood's gunfire but still afloat and in a good position to launch torpedoes at Jellicoe's line.

Had Arbuthnot been able to finish her off, together with the rest of her group and gather up-to-date information on the main German line, it would have been in accordance with battle instructions. The precipitate manner in which he went about it was true to his character.

At this time, Beatty was exchanging fire with the enemy main body, but when Arbuthnot turned his head and went away at a closer range and on a reciprocal course, the German gunlayers were presented with a far more attractive target. From the bigger British ships, Arbuthnot's ships were virtually hidden by the walls of water thrown up by salvoes from at least four enemy capital ships.

Visibility was such that even from the *Warrior*, 400 m (440 yards) astern of the *Defence*, the source of the fire could not be made out but, at 18.19, as he was forced to alter slightly away under the sheer weight of fire, Arbuthnot was struck by two heavy salvoes in succession. The *Defence* staggered but was still proceeding at high speed when she suddenly erupted in a cataclysmic explosion. The *Warrior*, herself under heavy fire, was so close astern that she steamed straight through the smoke and falling debris. Burning at each end, hydraulic power lost and guns in local control, she finally took a smashing blow in the port machinery space. Both spaces were filled with live steam and evacuated by those still able to, but with steam still feeding to the engines she kept her way and crept toward the protection of the 5th Battle Squadron. Already hit by an estimated 15 major- and six lesser-calibre projectiles, she would probably have shared the fate of the *Defence* but for the jamming of HMS *Warspite*'s helm. Describing two complete circles out of control, the battleship drew the fire of the enemy gunners.

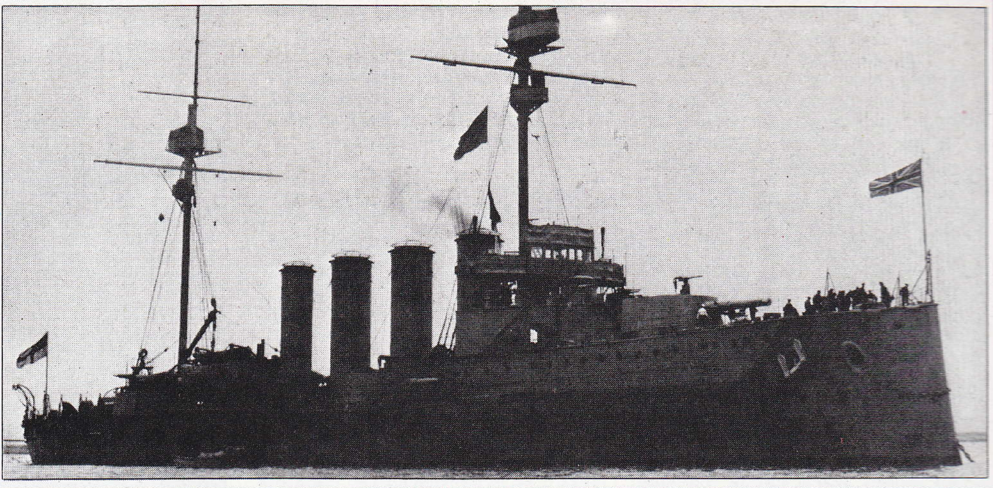
The Grand Fleet assembled at Scapa. The armoured cruisers were now ships without a role: their reconnaissance task usurped by lighter vessels and battlecruisers, they were relegated to low-risk operations after Jutland.



The battle moved away and the *Warrior*, with 68 dead, concentrated on survival. At 18.40 the seaplane carrier HMS *Engadine* hove in sight and stood by. An hour later the cruiser signalled that she was still trying to turn off steam but, at 19.45, ordered 'Stand by to tow me.' the *Engadine*, a lightly-built converted cross-Channel packet, passed a light line by skiff and then winched over a heavy towline. In deteriorating weather conditions, the tow slowly got under way and, once the *Warrior*'s hard-over rudder had been centred, built up to an estimated 7 kts (with the *Engadine* doing revolutions for 19 kts). Despite all efforts at damage control, the *Warrior* slowly settled by the stern and, although 160 km (100 miles) had been made good towards the Scottish coast, daybreak found the cruiser in a parlous state. In a rising sea the bulkheads were yielding under the strain and, at 07.15, the *Warrior* hoisted flag 'K', the pre-arranged signal for immediate evacuation. It was followed by her last signal, by semaphore: 'Slip wire – Never mind buoying it.' The *Engadine* ranged alongside and conducted an orderly transfer; with no way of sinking the cruiser she left her, quarter deck already awash, to founder. She had been about 320 km (200 miles) from the safety of Cromarty.

At the point in the battle where Arbuthnot had started his impetuous dash, the neighbouring *Duke of Edinburgh*, having received his signal, made to conform. Fortunately, the risky dash under Beatty's bows could not be undertaken and the cruiser lost touch with her leader. At 19.17 she joined up with the 2nd Cruiser Squadron and survived intact.

As wing ship of the 1st Cruiser Squadron, the *Black Prince* was some 21 km (13 miles) distant from Jellicoe and out of sight. At 17.33 she was sighted by the light cruiser HMS *Falmouth*: as the latter was attached to Beatty's force, this was the first link between the two groups. Nine minutes later the *Black Prince*, as requested, relayed to Jellicoe a situation report from the *Falmouth* but, almost immediately, was observed to make a major change of course. It was known that she was suffering from an earlier electrical breakdown but now, strangely, she 'disappeared'; she was not seen again until after midnight. At this time the German main body was breaking through the light forces massed at the tail of Jellicoe's column. The unfortunate cruiser, in what must have been a semi-crippled condition, blundered into a very alert enemy rearguard. At a range of only 1000 m (1,100 yards) she was suddenly illuminated by the searchlights of the old battleship SMS *Thüringen* which, subsequently, claimed to have put 15 305-mm (12-in) shells into her without reply. Blazing fiercely, she passed from sight.



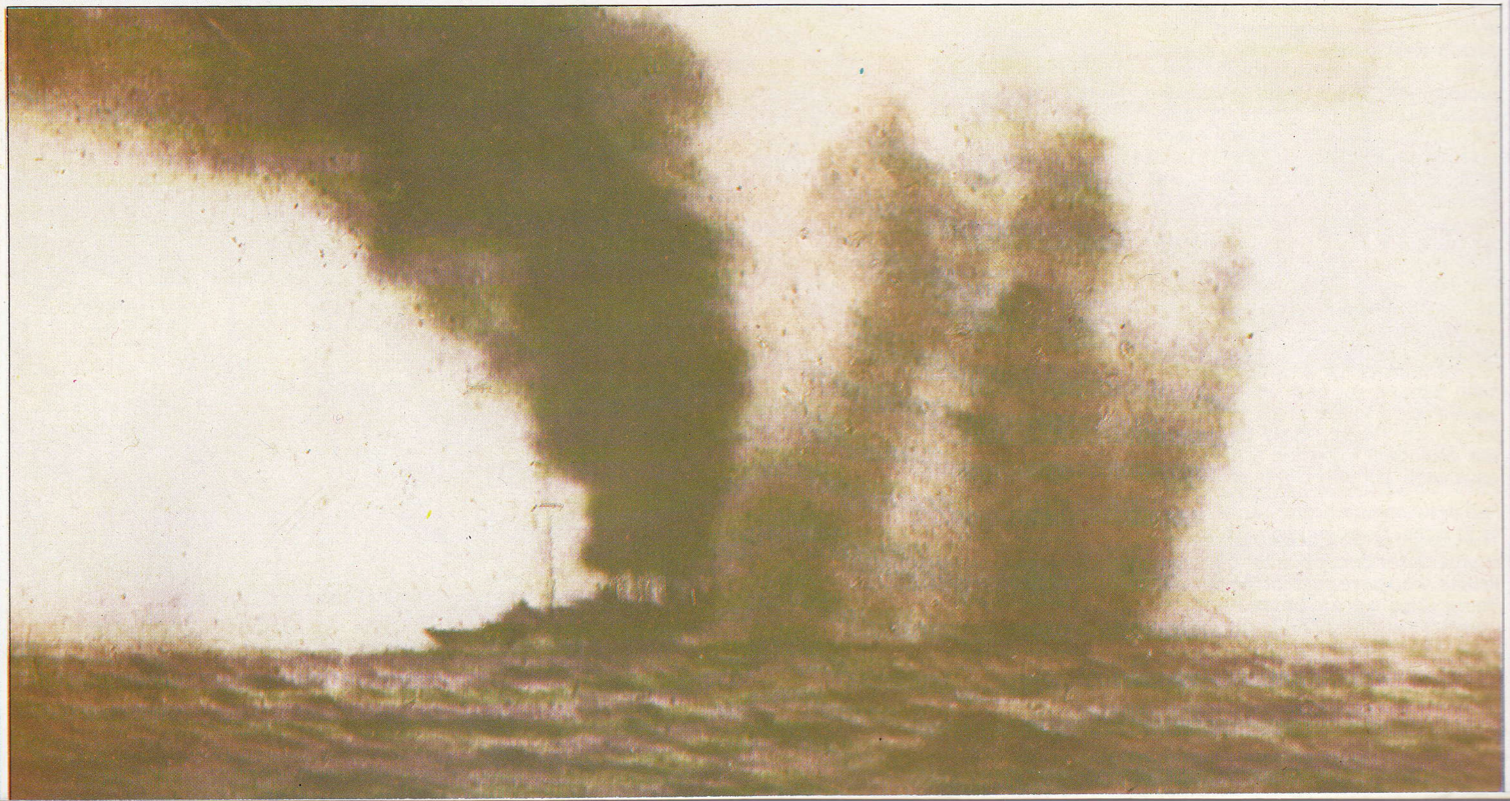
Crippled in the evening action, the unfortunate **Black Prince** *blundered into the dreadnought SMS* **Thuringen** *during the night. The battleship put 15 305-mm (12-in) shells into her before the blazing hulk drifted into the night.*

Also engaged in the desperate encounters of that night was the destroyer HMS *Spitfire*, which had carried the fight so well to the enemy that she had been in violent collision with the German battleship SMS *Nassau*. While engaged in patching up her considerable damage, the *Spitfire* was nearly run down by a large ship on fire 'from foremast to mainmast, on deck and between decks . . .' so close was she that the *Spitfire*'s crew could both hear and feel the fire. The wreck had two, widely-spaced funnels and was taken to be a battle-cruiser, but was almost certainly the *Black Prince* with her two centre stacks shot away. A massive explosion was observed soon afterwards but neither trace nor survivor was ever found.

The disaster to Arbuthnot's squadron accelerated the final decline of the armoured cruiser. Coronel and the Falklands had underlined the obvious, that older ships were no match for newer ones and that the newer ones themselves were easy prey for the battle-cruiser.

Jutland had shown in turn that armoured cruisers no longer had a role as the reconnaissnce wing of the fleet: too slow, they could now become victims of battleships as well. For the remainder of the war they were used in low-risk operations and areas, and for the most part, survived the peace only by months.

A cruiser is seen under large-calibre shell fire at Jutland. A murky day, visibility was further reduced by the vast volumes of smoke produced by coal-fired ships.



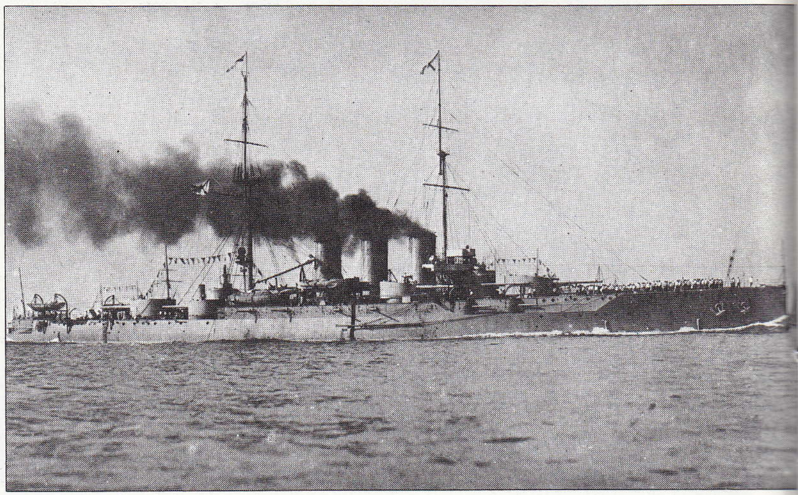
RUSSIA

'Rurik' class

The *Rurik* that served during World War I should not be confused with the ship of the same name completed in 1896. This latter vessel, a 10,950-tonner built like her near-sister *Rossia* in St Petersburg, so outclassed contemporary British protected cruisers that the two 'Powerfuls' were hurriedly constructed as a counter. Though potentially a challenge she was lost, like so much of the Russian fleet, in the war with Japan, being sunk in August 1904 in the battle of the Korea Strait.

Obviously the Russians thought the name to be worth continuing, for another armoured crusier (more correctly rendered *Riurik*, after the founder of a long dynasty of early tsars) was ordered soon afterwards from Vickers at Barrow, the first of two projected. Completed in 1907, she was of unique appearance with three funnels of equal height and a single, crossed mast which was stepped abaft them. Of a size with the contemporary British 'Minotaurs', she was slower but more heavily armed, capable of putting four 254-mm (10-in) and four 203-mm (8-in) guns on each broadside, compared with four 233.7-mm (9.2-in) and five 190.5-mm (7.5-in) guns, or about 20 per cent by weight. As the two major-calibre batteries were all housed in twin mountings, there was space also for 20 120-mm (4.7-in) QFs mounted singly in protective casemates, for the most part at upper-deck level. The *Rurik*'s protection was impressive in the large area covered, the only 'soft' zones being the extreme counter and the accommodation spaces on the two upper decks right forward.

The Russian fleet of 1914-8 was little better used than its predecessor of a decade before. The *Rurik* belonged to the Baltic Fleet, numerically superior to the Germans that opposed it. Both sides were actively engaged in minelaying, in the course of which the *Rurik* twice badly grounded. In July 1915 the Russians encountered an inferior German force east of Gotland and the *Rurik* claimed to have hit the *Roon* several times in an indecisive action. The *Rurik* was broken up in a general 'thinning' of the fleet in the later 1920s, after the Revolution.



Her three stubby funnels gave* Rurik *a unique silhouette. All her major batteries were housed in twin mountings which allowed space for 20 119.3-mm (4.7-in) quick-fire guns to be fitted in single casemates along the level of the upper deck.

Specification

'Rurik' class

Displacement: 15,200 tons standard

Dimensions: length 149.35 m (490 ft 0 in); beam 22.86 m (75 ft 0 in); draught 7.92 m (26 ft 0 in)

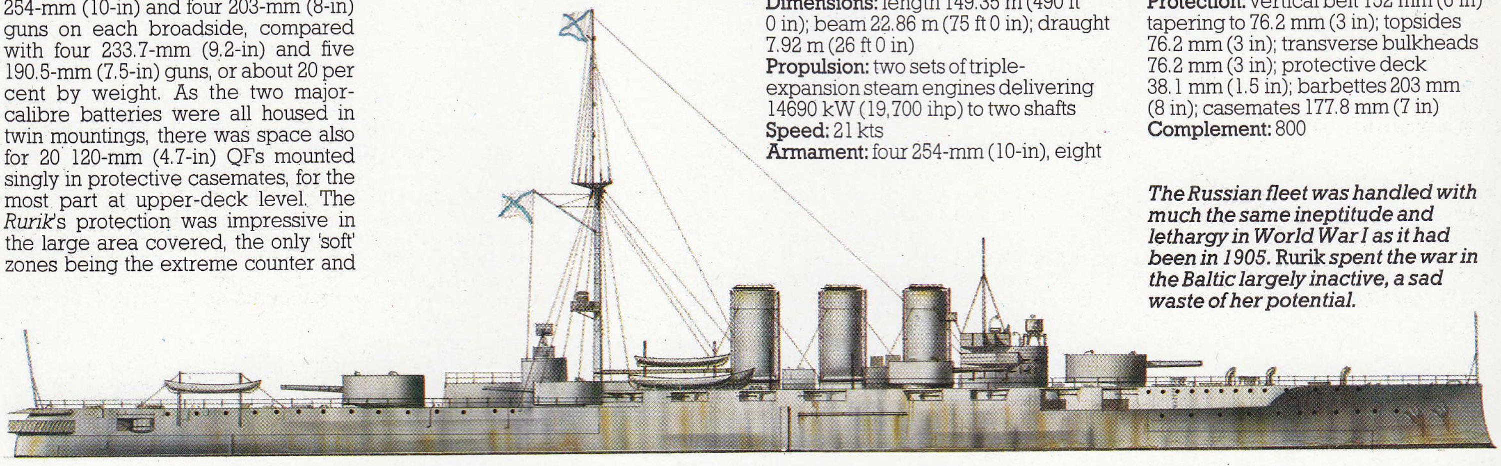
Propulsion: two sets of triple-expansion steam engines delivering 14690 kW (19,700 ihp) to two shafts

Speed: 21 kts

Armament: four 254-mm (10-in), eight 203-mm (8-in) and 20 120-mm (4.7-in) guns, and two 457-mm (18-in) torpedo tubes

Protection: vertical belt 152 mm (6 in) tapering to 76.2 mm (3 in); topsides 76.2 mm (3 in); transverse bulkheads 76.2 mm (3 in); protective deck 38.1 mm (1.5 in); barbettes 203 mm (8 in); casemates 177.8 mm (7 in)

Complement: 800



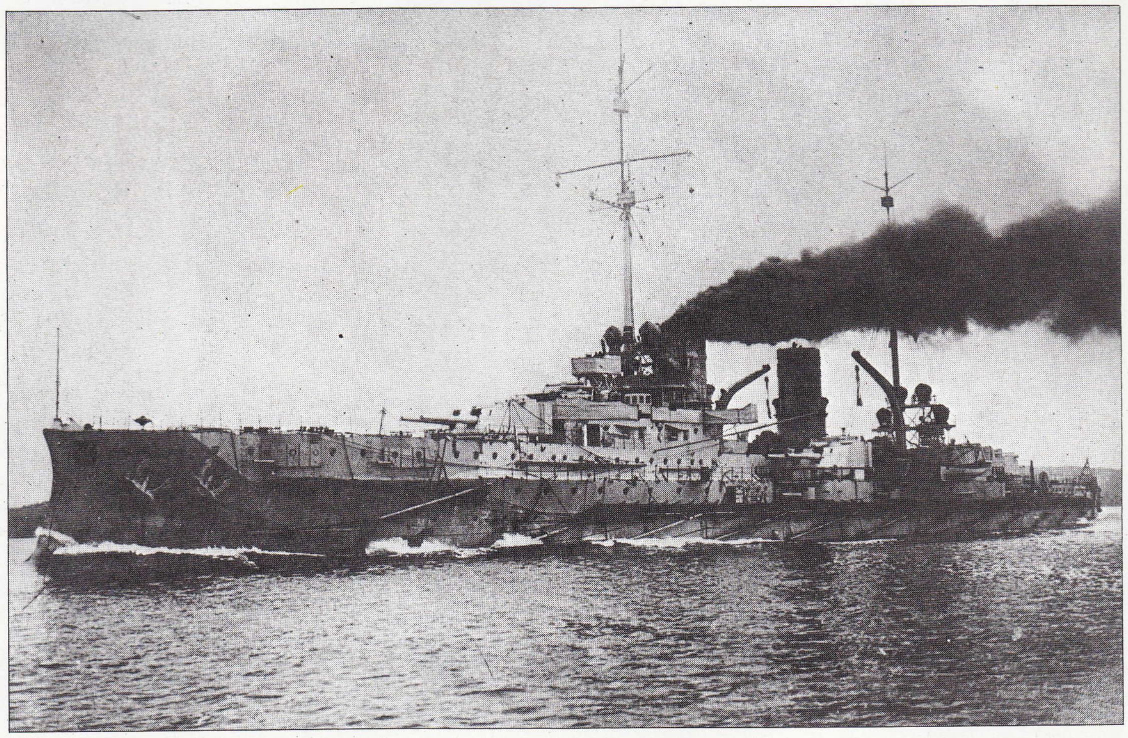
The Russian fleet was handled with much the same ineptitude and lethargy in World War I as it had been in 1905.* Rurik *spent the war in the Baltic largely inactive, a sad waste of her potential.

GERMANY

'Blücher' class

SMS ***Blücher*** (only unit of the **'Blücher' class**) affords a prime example of a misfit warship produced rapidly to meet a mistakenly-perceived threat from a rival power. The British built their first battle-cruisers in great secrecy, referring to them (deliberately misleadingly) as 'armoured cruisers'. Of the latter, true current examples were displacing upwards of 13,500 tons, with a mix of 233.7- and 190.5-mm (9.2- and 7.5-in) guns, and it was easy to make the Germans accept the idea of a 16,000-tonner with eight 233.7-mm guns when, in fact, the 'Invincibles' were to be 17,230-tonners with eight 304.8-mm (12-in) guns.

Committed to 'reply', the uncertain Germans prudently laid down a 'one-off', the *Blücher*. By adopting a 12-gun main battery, set in a six-turret hexagonal layout similar to that of the contemporary 'Nassau' class battleships, her designers expected a broadside advantage: not only did their 210-mm

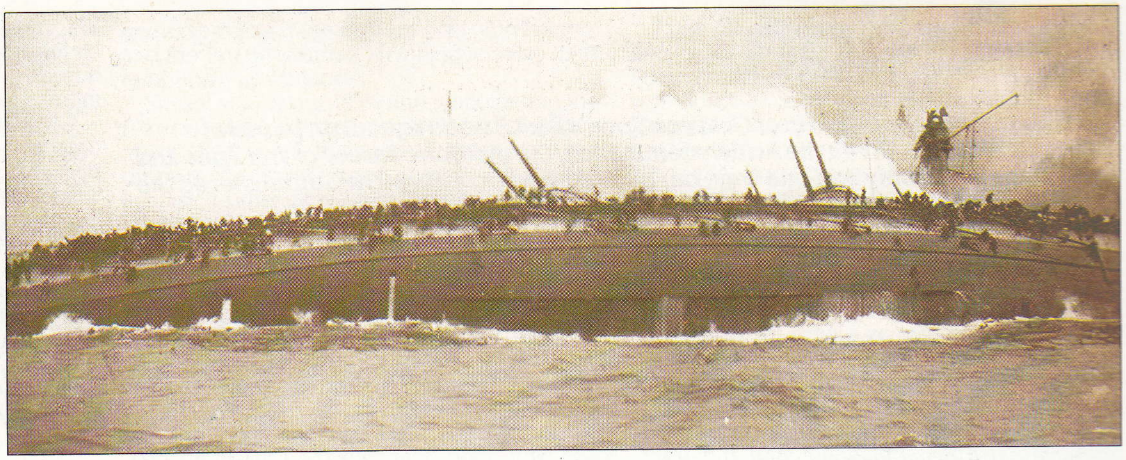


The design of the* Blücher *stemmed from a clever deception by the British, who gave out that the new 'Invincibles' were to be conventional cruisers mounting 233.7-mm (9.2-in) guns. The Germans built* Blücher *with a much superior armament.

(8.27-in) gun outrange the British 233.7-mm guns, but the available eight-gun broadside weighed nearly 1134 kg (2,500 lb) against the 862 kg (1,900 lb) of the five 233.7-mm guns expected to bear in a single-gun layout.

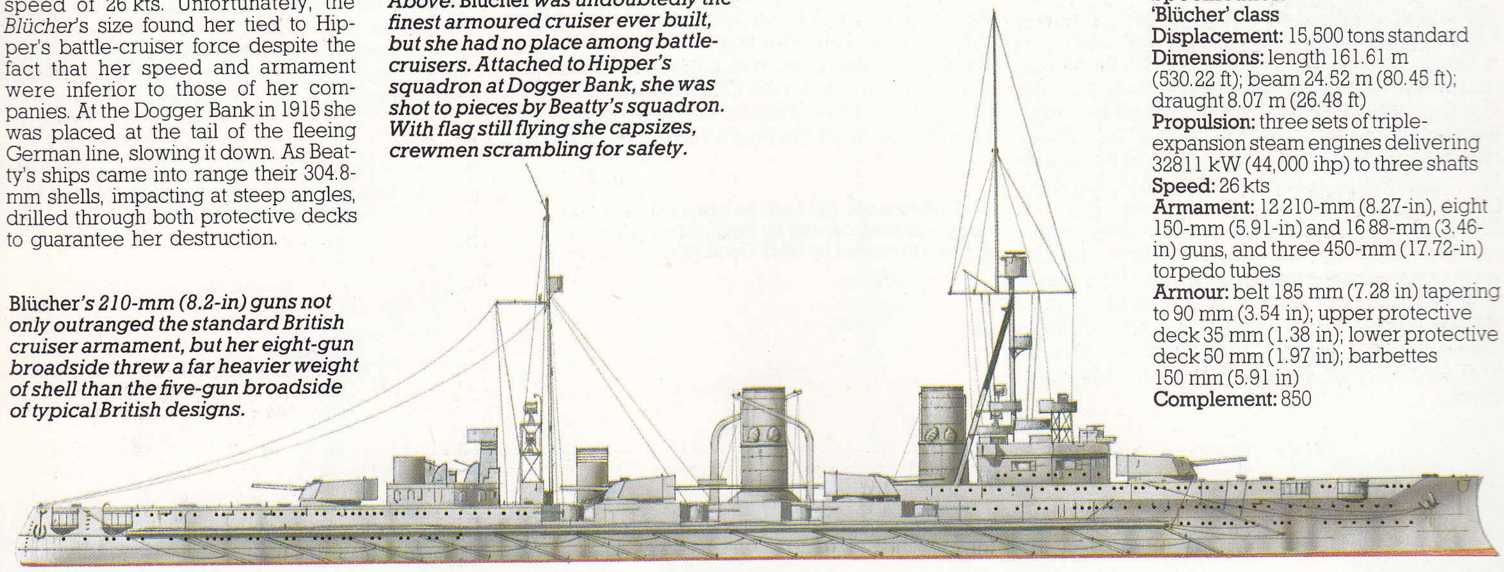
On their part the British, stimulated by their own deviousness, credited the *Blücher* with more than she had. As late as 1908 the authoritative *Brassey's Naval Annual*, though properly reporting six turrets, listed them as being four twin and two single 280-mm (11.02-in) mountings, tempering this with the observation that eight guns of this size 'at most' should be expected on the displacement.

Even when the true nature of the 'Invincibles' was known, the Germans had little choice but to complete the ship, a super armoured cruiser with full length belt, two protective decks and a speed of 26 kts. Unfortunately, the *Blücher*'s size found her tied to Hipper's battle-cruiser force despite the fact that her speed and armament were inferior to those of her companies. At the Dogger Bank in 1915 she was placed at the tail of the fleeing German line, slowing it down. As Beatty's ships came into range their 304.8-mm shells, impacting at steep angles, drilled through both protective decks to guarantee her destruction.



Above: Blücher *was undoubtedly the finest armoured cruiser ever built, but she had no place among battle-cruisers. Attached to Hipper's squadron at Dogger Bank, she was shot to pieces by Beatty's squadron. With flag still flying she capsizes, crewmen scrambling for safety.*

Specification
'Blücher' class
Displacement: 15,500 tons standard
Dimensions: length 161.61 m (530.22 ft); beam 24.52 m (80.45 ft); draught 8.07 m (26.48 ft)
Propulsion: three sets of triple-expansion steam engines delivering 32811 kW (44,000 ihp) to three shafts
Speed: 26 kts
Armament: 12 210-mm (8.27-in), eight 150-mm (5.91-in) and 16 88-mm (3.46-in) guns, and three 450-mm (17.72-in) torpedo tubes
Armour: belt 185 mm (7.28 in) tapering to 90 mm (3.54 in); upper protective deck 35 mm (1.38 in); lower protective deck 50 mm (1.97 in); barbettes 150 mm (5.91 in)
Complement: 850



Blücher*'s 210-mm (8.2-in) guns not only outranged the standard British cruiser armament, but her eight-gun broadside threw a far heavier weight of shell than the five-gun broadside of typical British designs.*

GERMANY

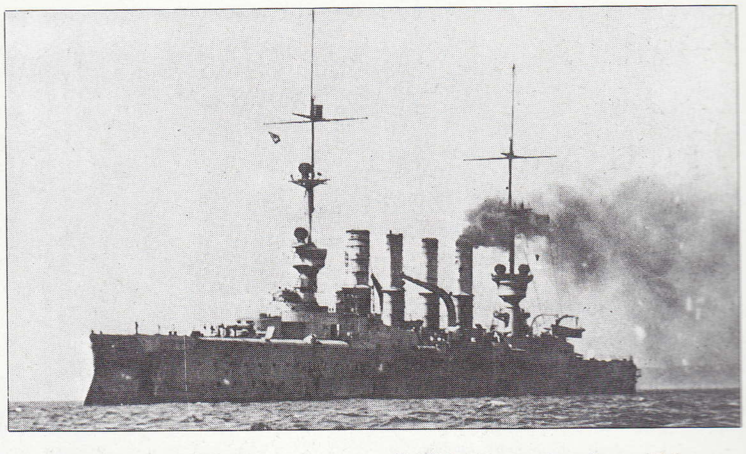
'Scharnhorst' class

Under the Naval Act of 1900, with later additions, the German navy was set at 38 battleships, 20 armoured cruisers, 38 small cruisers and 144 torpedo boats; but the programme was rather spoiled by the advent of the Dreadnought. It was perceived that there was a need for 'at least one squadron of efficient armoured cruisers' for use outside home waters.

As in light cruisers so in larger cruisers, the Germans evolved continuously, producing mainly 'one-offs' and pairs of ships. Thus, in 1900, they launched their first pair, SMS ***Fürst Bismarck*** and SMS ***Prinz Heinrich*** of the **'Bismarck' class** which, though of similar dimensions, varied in displacement because of two separate standards of protection. Each incorporated two of the older battleships' guns of 240-mm (9.45-in) calibre. These were followed closely by the two **'Prinz Adalbert' class** units SMS ***Prinz Adalbert*** and SMS ***Friedrich Karl*** which, again of similar size, adopted the lighter scheme of protection, greater installed horsepower and doubled the number of main battery guns by changing to the excellent 210-mm (8.27-in) gun. Despite this, their speed was barely 20 kts.

The two **'Roon' class** units SMS ***Roon*** and SMS ***Yorck***, launched in 1903-4, stretched the design minimally to improve the power by about 8 per cent. This, predictably, increased their speed by less than a knot. An improved layout of the secondary 150-mm (5.91-in) guns (five to a side, set on two levels) enabled the protection to be better distributed. The result of more boilers was an increase in funnels from three to four.

Although their armament was excellent, the 'Roons' were inferior in speed and protection (marginally) compared with their Royal Navy yardsticks. This was rectified in the two **'Scharnhorst' class** units SMS ***Scharnhorst*** and SMS ***Gneisenau*** of 1906, which achieved 22.5 kts with 30 per cent more power. The Germans resisted the temptation to increase the scale of armament (except to substitute four 210-mm guns for casemated 150-mm guns) and improved the protection, the belt armour being thickened slightly at the expense of the protective deck. Their application was sound, for the ships both absorbed tremendous punishment before being sunk, as related elsewhere, at the Falklands.



SMS Gneisenau, *together with her sister* Scharnhorst, *formed the principle striking power of von Spee's East Asiatic squadron. The two cruisers represented a considerable improvement over the earlier 'Roons' and gave Germany the victory in the first major naval battle of the war.*

Specification
'Scharnhorst' class
Displacement: 11,500 tons standard
Dimensions: length 144.55 m (474.25 ft); beam 21.63 m (70.96 ft); draught 7.46 m (24.48 ft)
Propulsion: three sets of triple-expansion steam engines delivering 19388 kW (26,100 ihp) to three shafts
Speed: 22.5 kts
Armament: eight 210-mm (8.27-in), six 150-mm (5.91-in) and 20 88-mm (3.46-in) guns, and four 450-mm (17.72-in) torpedo tubes
Armour: belt 150 mm (5.91 in) tapering to 80 mm (3.15 in); protective deck 50 mm (1.97 in); barbettes 170 mm (6.69 in)
Complement: 770

The *Scharnhorst* in Action

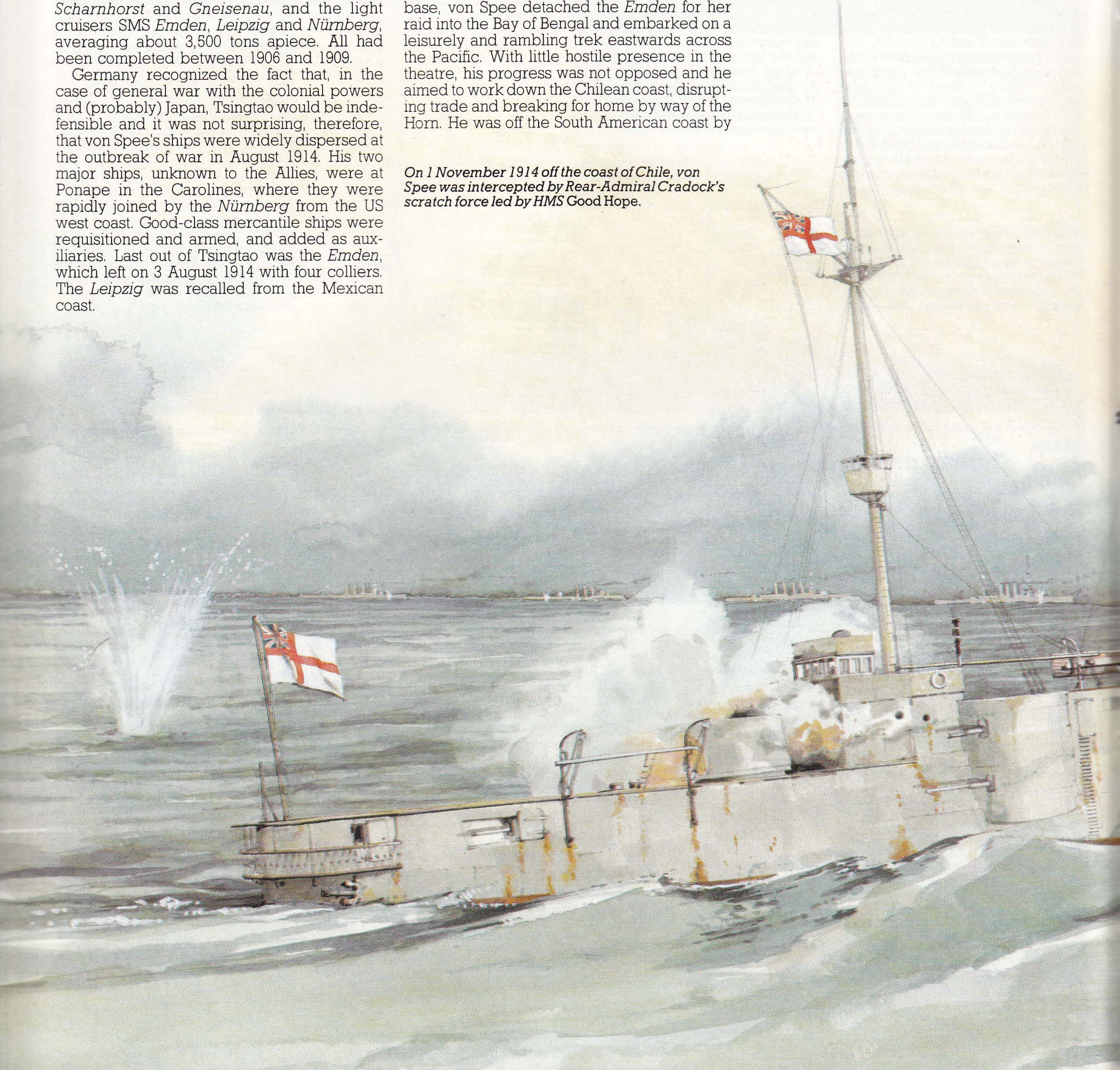
Scharnhorst *was the flagship of Graf von Spee's East Asiatic squadron based at Tsingtao in China. Given the British dominance, the meteoric career of von Spee and his vessels could only end one way, but before he was cornered he administered the Royal Navy's first major defeat for two and a half centuries.*

In the early years of the 20th century, Germany's imperial trading interests in China were administered from an enclave at Tsingtao, which acted also as a base for river gunboats and the powerful East Asiatic Squadron. Commanded by Vizeadmiral Graf von Spee, the latter was a highly efficient force consisting of the 11,400-ton armoured cruisers SMS *Scharnhorst* and *Gneisenau*, and the light cruisers SMS *Emden*, *Leipzig* and *Nürnberg*, averaging about 3,500 tons apiece. All had been completed between 1906 and 1909.

Germany recognized the fact that, in the case of general war with the colonial powers and (probably) Japan, Tsingtao would be indefensible and it was not surprising, therefore, that von Spee's ships were widely dispersed at the outbreak of war in August 1914. His two major ships, unknown to the Allies, were at Ponape in the Carolines, where they were rapidly joined by the *Nürnberg* from the US west coast. Good-class mercantile ships were requisitioned and armed, and added as auxiliaries. Last out of Tsingtao was the *Emden*, which left on 3 August 1914 with four colliers. The *Leipzig* was recalled from the Mexican coast.

Though there was great Allied concern about his presence, threatening as it did a large number of trooping convoys, their activity kept von Spee lying low. He proceeded to Pagan Island, where he was joined by the *Emden*. Deciding that offensive activity in the Pacific would certainly result in the disablement and destruction of his squadron, which lacked any base, von Spee detached the *Emden* for her raid into the Bay of Bengal and embarked on a leisurely and rambling trek eastwards across the Pacific. With little hostile presence in the theatre, his progress was not opposed and he aimed to work down the Chilean coast, disrupting trade and breaking for home by way of the Horn. He was off the South American coast by 27 October, his cruiser strength supplemented by the arrival of SMS *Dresden*, which had been hustled out of the South Atlantic by an ominous increase in British naval presence.

On 31 October von Spee had the *Leipzig* detached in the neighbourhood of the small port of Coronel, where she detected the presence of the British cruiser HMS *Glasgow*. As there seemed a good chance of destroying the latter the German admiral came south, and the afternoon of the following day found him 80 km (50 miles) north west of the port. His two armoured cruisers were in line ahead, closely followed by the *Leipzig*. Some distance astern was the *Dresden*, with the *Nürnberg* out of sight to the north. The ragged line was pounding at 14 kts into a lumpy sea caused by the



On 1 November 1914 off the coast of Chile, von Spee was intercepted by Rear-Admiral Cradock's scratch force led by HMS Good Hope.

residue of a southerly gale when, at about 16.30, the smoke of two warships was sighted to the south west.

The approaching ships were identified as British and, not knowing their intentions, von Spee steered inshore to cut them off from any sanctuary in neutral waters. Some degree of concentration was desirable and neither side pushed for an immediate conclusion, von Spee particularly not knowing the British strength backing the *Glasgow*.

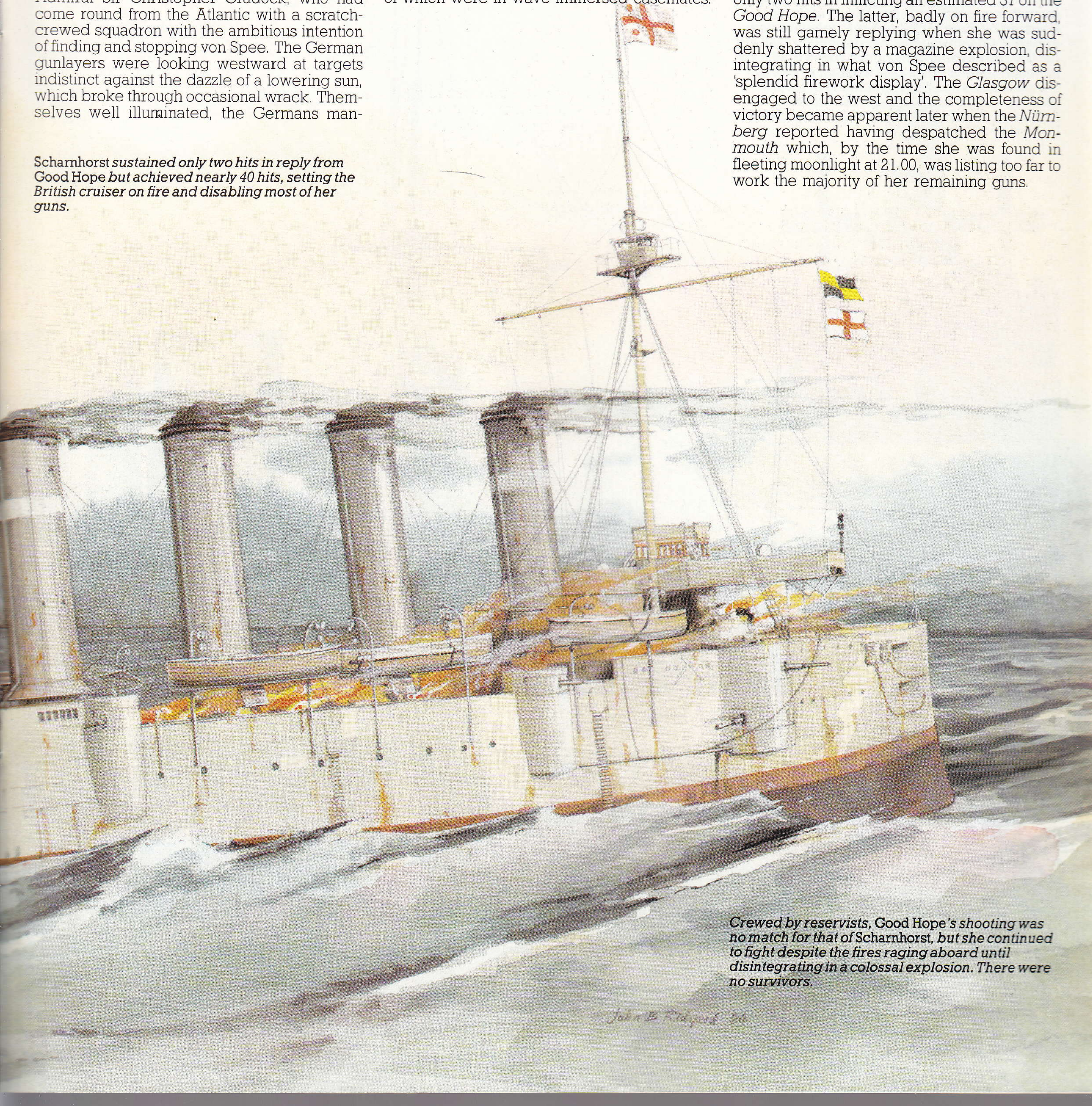
By 18.00 the Germans were running roughly parallel with a four-funnelled 'Drake' class armoured cruiser and a three-funnelled 'County'. These were HMS *Good Hope* and *Monmouth*, the former wearing the flag of Rear-Admiral Sir Christopher Cradock, who had come round from the Atlantic with a scratch-crewed squadron with the ambitious intention of finding and stopping von Spee. The German gunlayers were looking westward at targets indistinct against the dazzle of a lowering sun, which broke through occasional wrack. Themselves well illuminated, the Germans manoeuvred at this stage to keep well out of range, and the British seemed unwilling to seize their temporary advantage.

Sunset was about 19.00 and, anticipating the reversal of conditions, von Spee had closed to about 11000 m (12,030 yards). Once the sun had dipped, the British were sharply silhouetted against the afterglow while his own force rapidly merged with the increasing gloom in the east. The *Scharnhorst*'s opening three-gun salvo put a neat group into the sea 500 m (550 yards) short of the *Good Hope*. Her third salvo put out of action, the *Good Hope*'s forward 233.7-mm (9.2-in) guns, and 12 210-mm (8.27-in) guns were now bearing against a solitary 233.7-mm and a variety of 152-mm (6-in) guns, many of which were in wave-immersed casemates.

From the outset, the unpractised British gunnery was wretched and, with the advantage of light, von Spee closed in. By 19.30 the range was down to 'sixty hectometres' (about 6,500 yards) and the rapid German fire was smothering the opposition. At the cost of four hits, the *Gneisenau* forced the *Monmouth* out of line, badly on fire, with her burning interior visible in places through rents in her glowing plates. The *Gneisenau* then shifted to the difficult and fleeting target of the *Glasgow*, and the *Nürnberg* was detailed to find and sink the stricken *Monmouth*.

Good Hope destroyed

The *Scharnhorst*, meanwhile, had sustained only two hits in inflicting an estimated 37 on the *Good Hope*. The latter, badly on fire forward, was still gamely replying when she was suddenly shattered by a magazine explosion, disintegrating in what von Spee described as a 'splendid firework display'. The *Glasgow* disengaged to the west and the completeness of victory became apparent later when the *Nürnberg* reported having despatched the *Monmouth* which, by the time she was found in fleeting moonlight at 21.00, was listing too far to work the majority of her remaining guns.

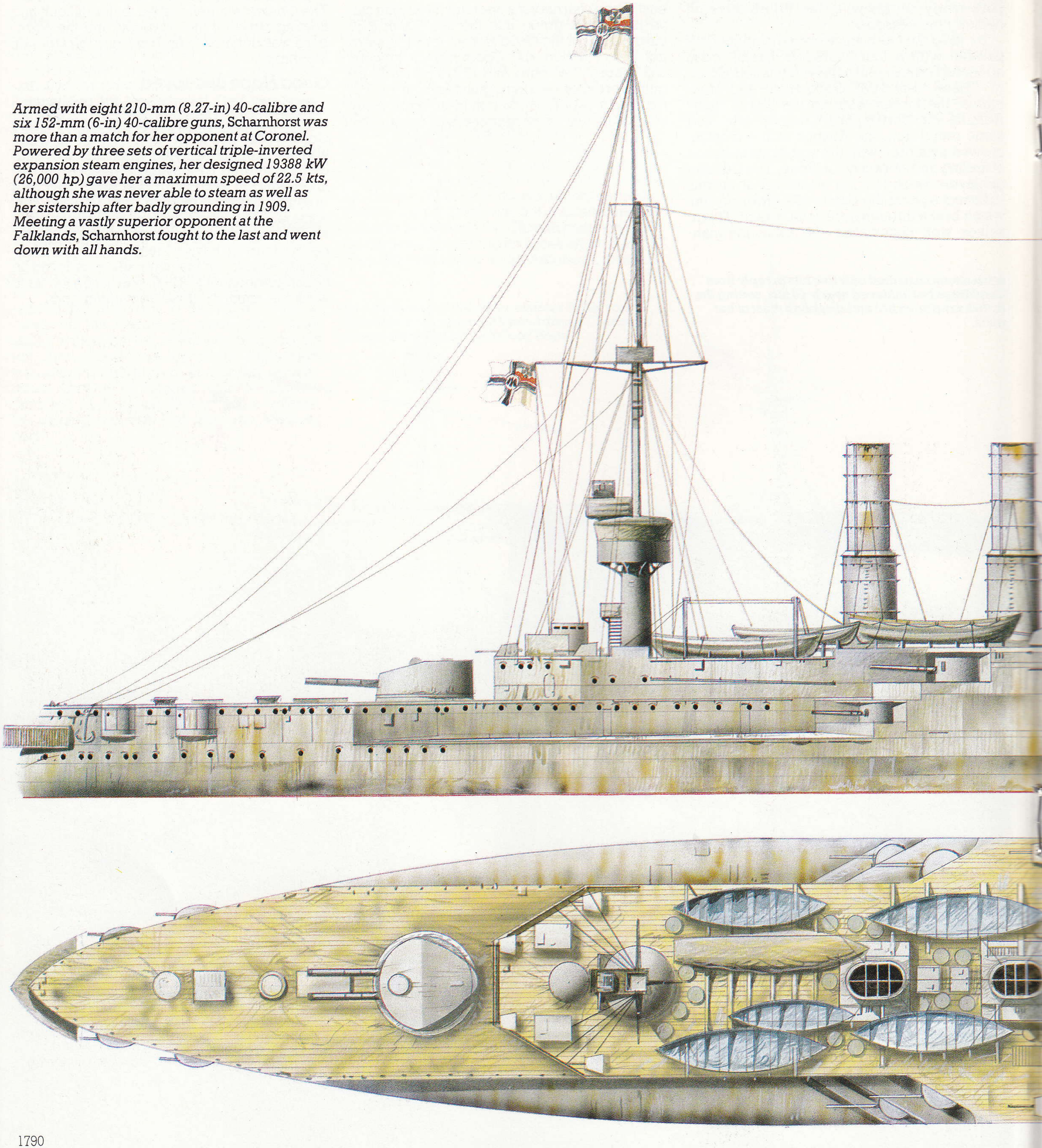


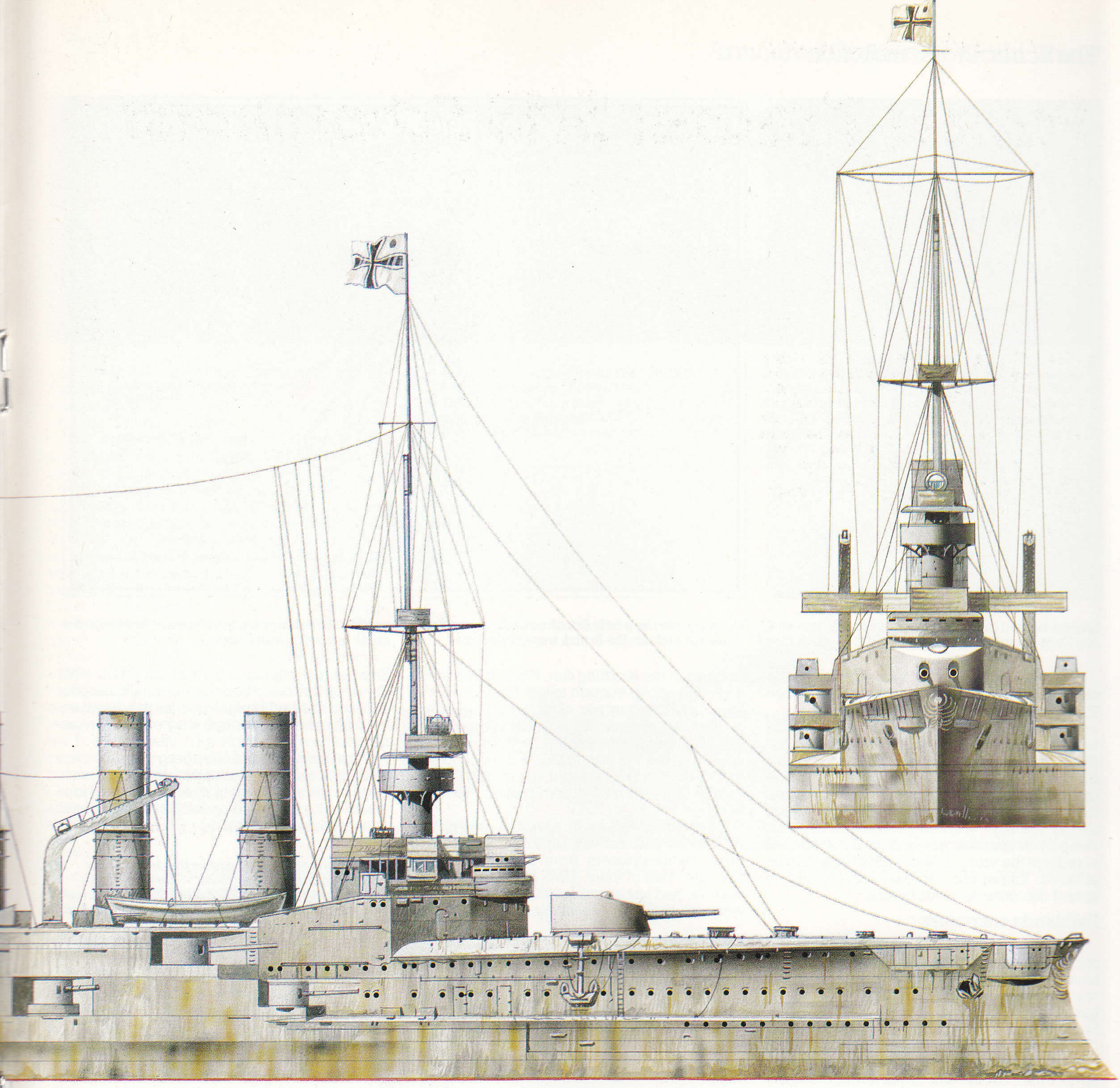
Scharnhorst *sustained only two hits in reply from* Good Hope *but achieved nearly 40 hits, setting the British cruiser on fire and disabling most of her guns.*

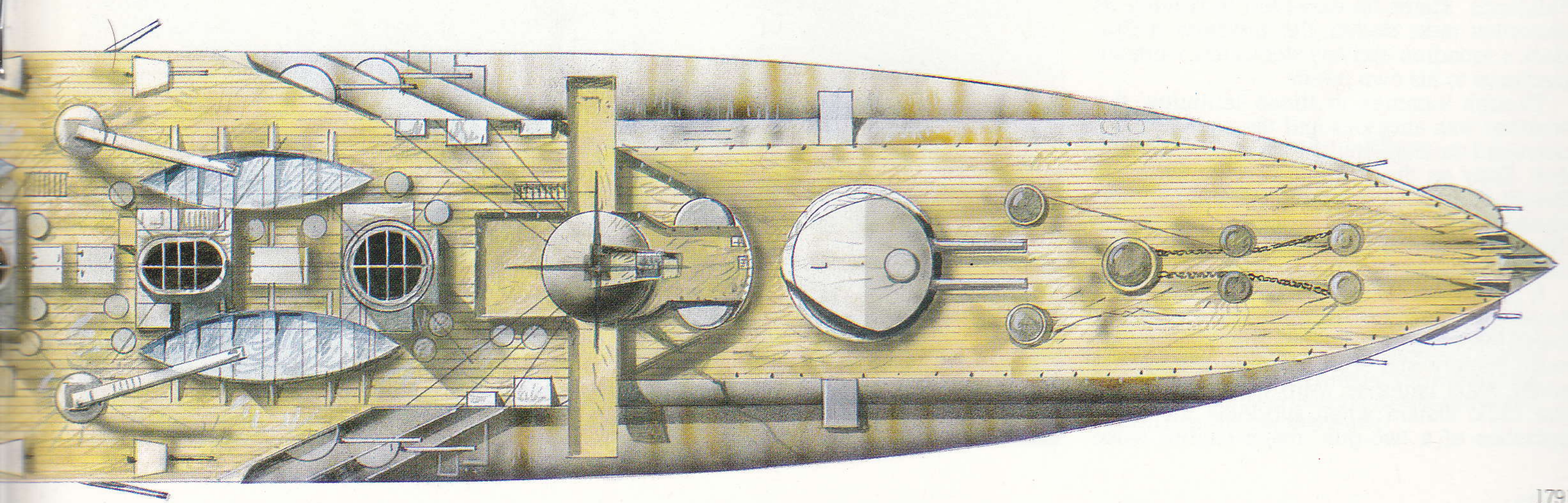
Crewed by reservists, Good Hope's *shooting was no match for that of* Scharnhorst, *but she continued to fight despite the fires raging aboard until disintegrating in a colossal explosion. There were no survivors.*

Panzer-Kreuzer SMS *Scharnhorst*

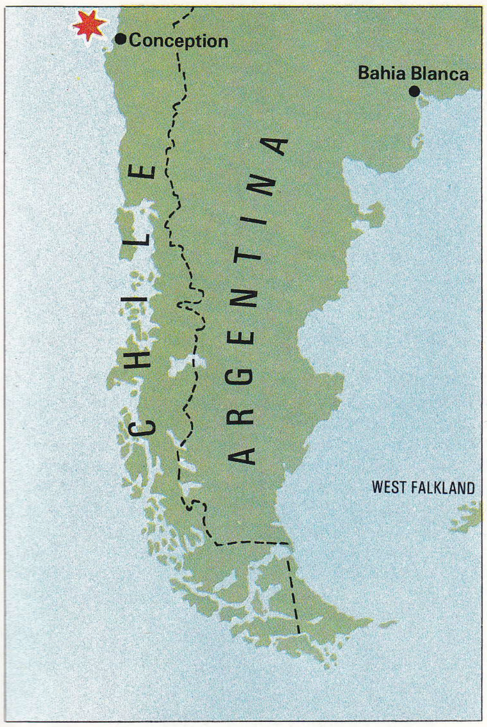
Armed with eight 210-mm (8.27-in) 40-calibre and six 152-mm (6-in) 40-calibre guns, Scharnhorst *was more than a match for her opponent at Coronel. Powered by three sets of vertical triple-inverted expansion steam engines, her designed 19388 kW (26,000 hp) gave her a maximum speed of 22.5 kts, although she was never able to steam as well as her sistership after badly grounding in 1909. Meeting a vastly superior opponent at the Falklands,* Scharnhorst *fought to the last and went down with all hands.*



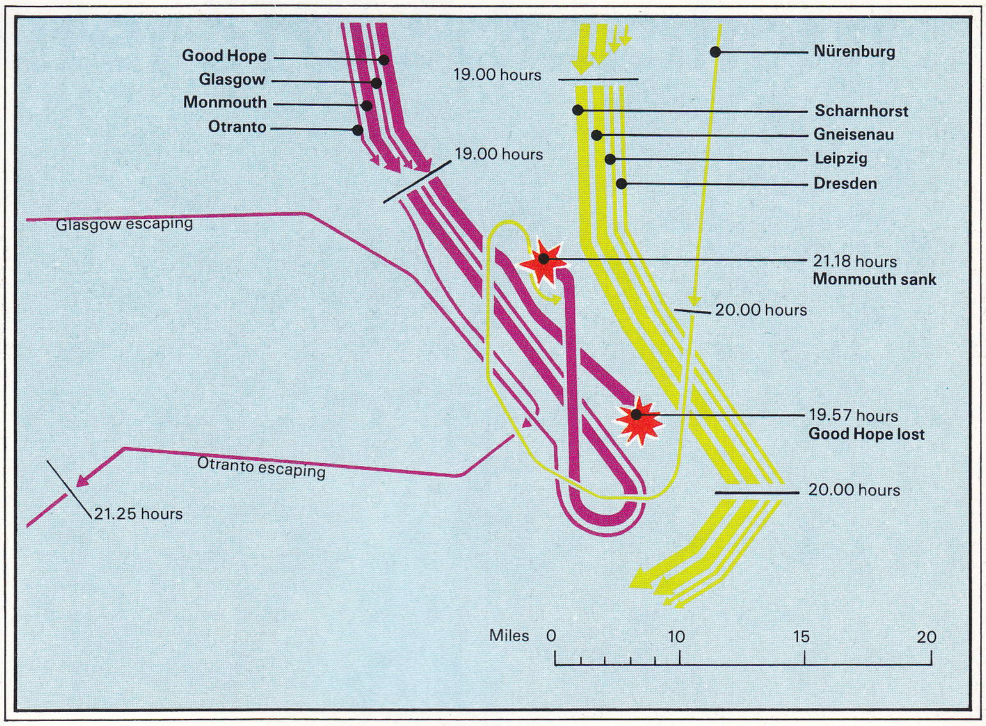




The *Scharnhorst* in Action



Leipzig located HMS Glasgow *alone at Coronel and von Spee brought his squadron south to attack her.*



Running into the whole British squadron, von Spee closed in at dusk; the British were silhouetted against the setting sun, the Germans hidden in the murk by the Chilean coast.

Like the *Good Hope* the *Monmouth* left no survivors, the seas being, in any case, too fierce to permit the lowering of boats.

Von Spee seemed far from elated by his success. Though he had suffered no significant damage, he had expended almost half of his major-calibre ammunition. There was little prospect of obtaining more, he was 16000 km (10,000 miles) from home and he was all too aware that the world's greatest seapower, stung by its reverse, would be seeking him out to redress the score. The day after the action he entered Valparaiso for coal but refused to attend the general celebrations.

Falklands encounter

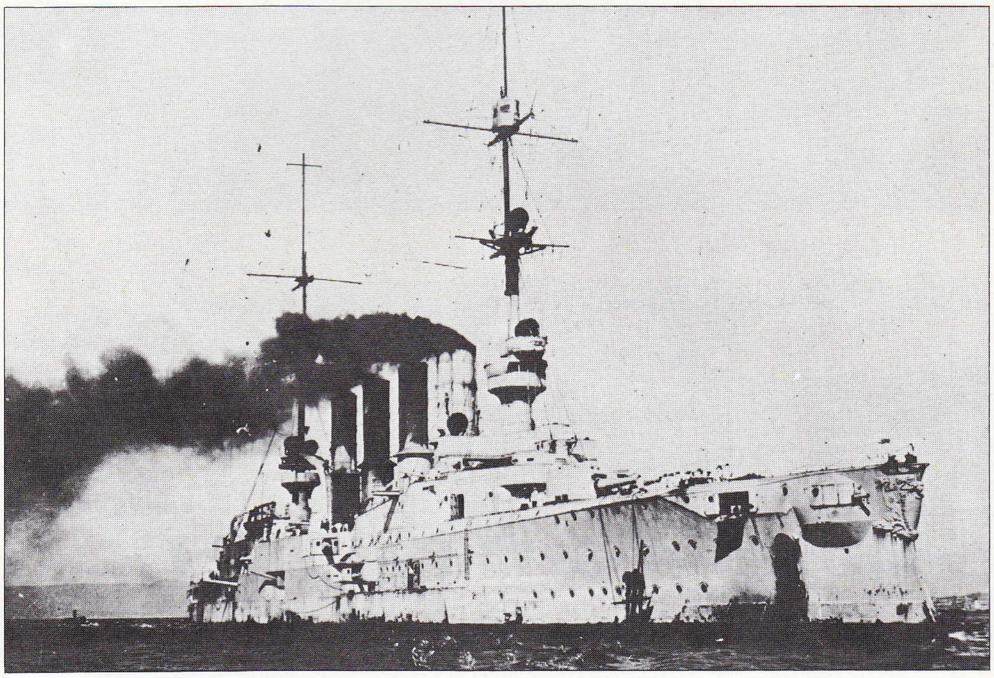
Possibly a quick break round the Horn and into the vastness of the South Atlantic would have spelled success at this point, but again von Spee seemed to be afflicted by indecision, hanging around at the isolated island of Mas-a-Fuera and then an anchorage on the desolate Chilean coast, north of the Magellan Strait. Only on 26 November, 25 days after the action off Coronel, did he sail at full strength for the Falklands. There he expected to destroy its important radio station, the survivors of Cradock's squadron and any stocks that were superfluous to his own needs.

Though summer in these latitudes, the weather was atrocious and the squadron did not round the Horn until the night of 1/2 December. Early on the morning of 2 December a British sailing vessel, laden with coal, was sighted. Ever mindful of his long run home, von Spee took her into sheltered waters and spent three days transferring her cargo.

8 December dawned bright and clear. It found the *Gneisenau*, supported by the *Nürnberg*, following the coast of East Falkland toward Stanley; von Spee was hull-down to the south. Main batteries were being trained on the radio station when suddenly the great splashes of a two-gun, major-calibre salvo erupted in the morning sun. It was followed by a second, close enough to put fragments onto the *Gneisenau*'s upper deck. Standing farther out, the two German ships eventually rounded the bluff that screened the harbour. At 09.40 could be seen a great smoke cloud and tall, tripod masts. These could mean only British capital ships. Von Spee had wasted too much time.

After the disaster at Coronel the British Admiralty had moved rapidly, despatching three battle-cruisers from the Grand Fleet strength. Two of them, HMS *Invincible* and *Inflexible*, had just arrived with four cruisers and were still coaling. Fortunately for Vice-Admiral Sturdee, in command, the old battleship HMS *Canopus* had been beached as a static harbour defence and had bought time for the disadvantaged force by firing indirectly on the *Gneisenau*.

The *Gneisenau* and *Nürnberg* closed on von Spee and the whole squadron made all haste away to the south-east in loose formation. None could make designed speed through foul hulls and machinery problems. Even before they



Scharnhorst *enters Valparaiso the day after the battle. Although elated by his victory, von Spee knew he was nearly 16000 km (10,000 miles) from home and the Royal Navy would be seeking revenge.*

Above: Von Spee's squadron as seen from the Falklands, 8 December 1914. After a lucky shot from HMS Canopus*, Spee made off at speed, but before he was over the horizon the battlecruisers were leaving Port Stanley in pursuit.*

were over the horizon the Germans could see the first British ships leaving Stanley. Visibility was perfect, the day was young and Nemesis was but a matter of time.

The *Leipzig* began to lag, but urgency was maintained by the constant sight of the pursuers who, in no hurry, overhauled them inexorably under a dense cloud of funnel smoke. At 12.47 came the ranging 304.8-mm (12-in) salvo from the leading battle-cruiser, the *Invincible*. By 13.00 the Germans were surrounded by splashes yet still unable to reply. At 13.20, still without significant damage, von Spee detached his light cruisers to shift for themselves but could see their British counterparts peel off in pursuit while his own ships were still suffering at the hands of the two battle-cruisers. He needed to close the range so turned abruptly and, at 13.30, got to within his 12000-m (13,125-yard) maximum. Opening fire, the *Scharnhorst* rapidly hit the *Invincible*, but the British reply was merely to sheer further off and continue the bombardment. The British were obviously content to stay at long range and expend as much ammunition as it took, even though the *Gneisenau* was having a light time with her big adversary, the *Inflexible*, blinded by her leader's smoke.

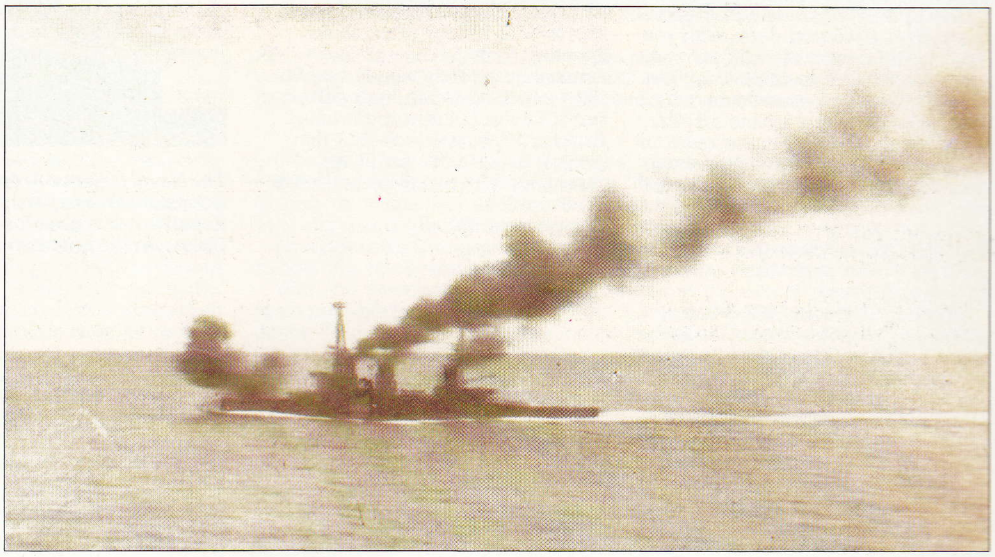
The kill

Long periods elapsed with no firing on either side, as each manoeuvred for advantage. By 15.00 the weather was deteriorating and the British obviously went for a decision. The range fell to 10975 m (12,000 yards) which, while allowing von Spee's ships to use their secondary 150-mm (5.9-in) guns, began to prove decisive. The *Scharnhorst* was burning heavily forward and had lost her third funnel. As her shooting began to fall off the *Gneisenau* also started to list. Ignoring a call to surrender, von Spee's ship suddenly ceased fire 'like a light blown out' and foundered at 16.17. There were no survivors.

The *Gneisenau* fought on though, through the mist of drizzling rain now falling, she could see her two opponents had been joined by a four-funnelled armoured cruiser, HMS *Carnarvon*. The murk offered no sanctuary from punishment. Reportedly hit by over 50 large-calibre rounds, the cruiser had her foremost funnel leaning drunkenly against the second, her foremast was missing and she was faltering to a stop in a cloud of her own smoke. Ammunition had run out and a British battle-cruiser closed the range and put 15 deliberate rounds into the wreck. The survivors formed up on deck, gave three cheers for the Kaiser and abandoned; only 200 were saved from the freezing water.

Of the light cruisers, only the *Dresden* was to escape for a further brief existence. Coronel had been terribly avenged but, besides proving the obvious supremacy of the battle-cruiser over the armoured cruiser, the Falklands battle demonstrated also the toughness of German ships, the surprising range of their armament and the fighting spirit of their crews.

Below: Her turbines giving her a 5-kt advantage over the German cruisers, **Invincible** ***opened fire with her forward 304.8-mm (12-in) guns shortly before 13.00 hours.*** **Scharnhorst** ***and*** **Gneisenau** ***swung towards their mighty enemy to give their consorts a chance to escape.***



Scharnhorst ***went down at 16.17 with all 770 of her crew and the gallant von Spee.*** **Gneisenau** ***did not survive her sister for long; flags still flying and out of ammunition, she was battered into submission by 18.00. The battle-cruisers stopped, and saved 200 men from the freezing water.***

UK

'Blake' class

Closely related to the 'Edgar' and 'Crescent' classes, the **'Blake' class** together with the 'Powerful' class ships were protected cruisers but are included to show the stem from which grew the later armoured cruiser. 'First-generation' armoured cruisers had ceased in the UK with the 'Orlando' class of 1886-7 which, on a limited displacement, had been unhandy to the point where the ships were of nearly similar performance to the battleships for which they were supposed to be scouting. Weight-saving by the suppression of vertical belts led to a dozen years of ascendancy for the protected cruiser.

The Royal Navy's cruiser force was expanded rapidly through the Naval Defence Act of 1889. Of first-class cruisers, designed to act as flagships and to hold their own in the interests of trade protection on distant stations, the two 'Blakes' of 1889-90, HMS ***Blake*** and ***Blenheim*** were a sound design. Protection of the ship proper was vested in the arched armoured deck, with vertical armouring introduced only around vitals such as the conning tower, casemates and ammunition hoists. What was to become a standard armament layout of heavy chase guns for and aft, backed by a casemated secondary battery, was also incorporated. It was, in fact, in the 'Blakes' that the maindeck casemate was introduced. With their two lofty funnels and original rig they looked particularly imposing in Victorian livery.

Between 1890 and 1892 was built a first derivative in the form of the seven slightly shorter **'Edgar' class** first-class cruisers with an armament similar to that of the 'Blakes'. The 'Edgars' were HMS ***Edgar***, ***Endymion***, ***Gibraltar***, ***Grafton***, ***Hawke***, ***St George*** and ***Theseus***. The two **'Crescent' class** units HMS ***Crescent*** and ***Royal Arthur*** were built in the same period, much the same but, curiously, with the forward 233.7-mm (9.2-in) gun replaced by an extra pair of 152.4-mm (6-in) guns. All were reliable ships, with proven machinery and excellent for colonial service.

By the outbreak of war all were considered old and outdated, and the two original pairs, together with two 'Edgars', had been demoted to use as various types of depot ship. The *Hawke* was sunk by submarine in 1914 (the same *U-9* that sank three 'Cressys'). The remaining four rendered sterling service in the blockading 10th Cruiser Squadron and, after being bulged in 1914-5, at the Dardanelles.

Specification

'Blake' class

Displacement: 9,150 tons standard

Dimensions: length 114.30 m (375.0 ft); beam 19.81 m (65.0 ft); draught 7.85 m (25.75 ft)

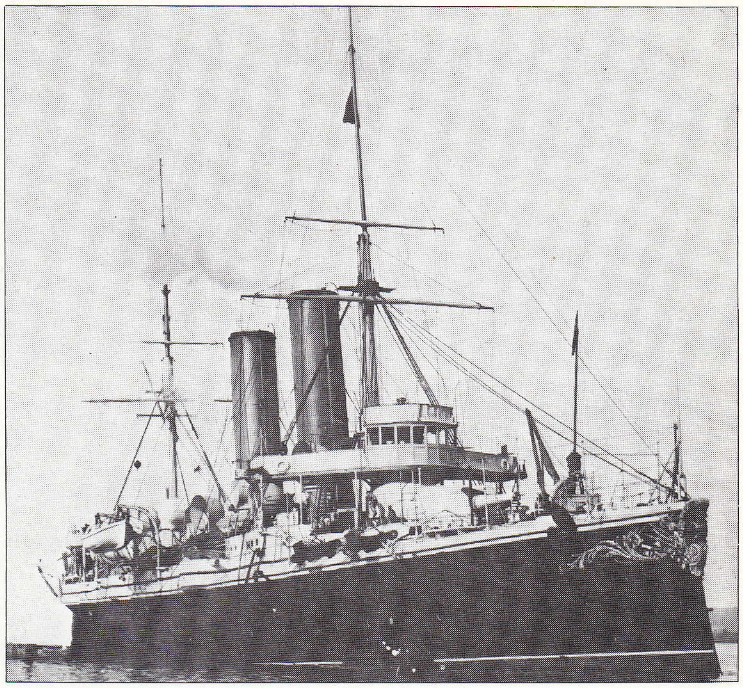
Propulsion: two sets of triple-expansion steam engines delivering 9694 kW (13,100 ihp) to two shafts

Speed: 21.5 kts

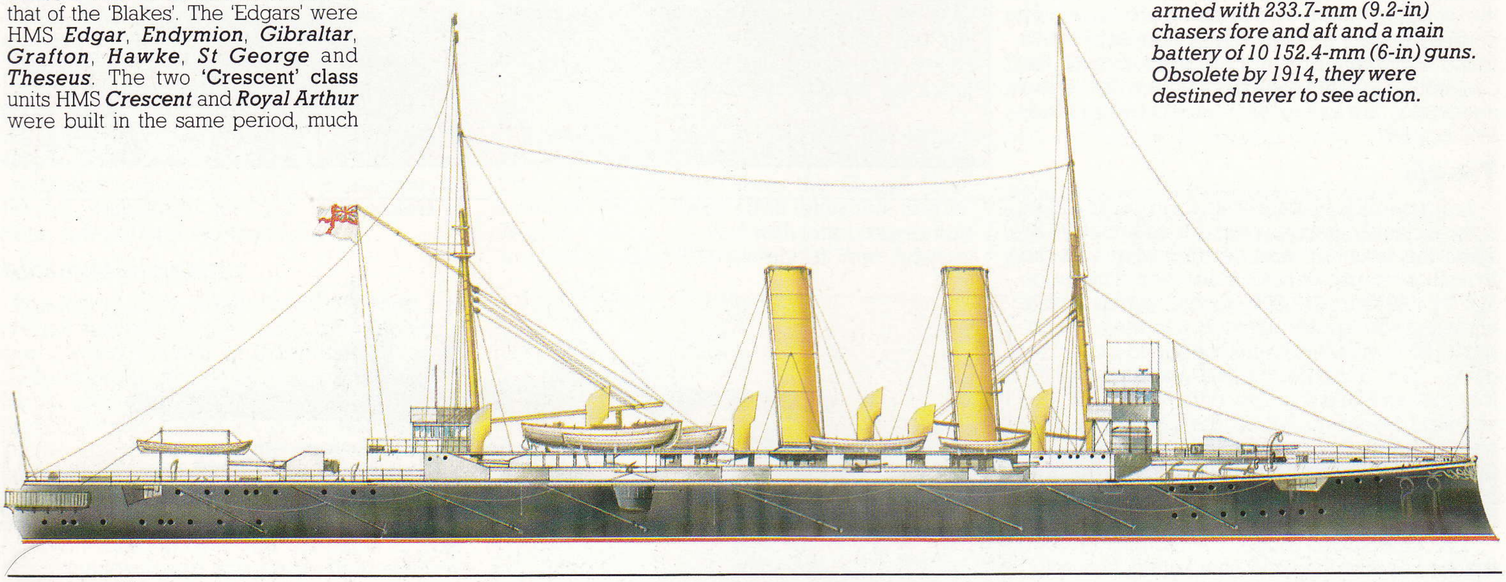
Armament: two 233.7-mm (9.2-in), 10 152.4-mm (6-in) and 16 3-pdr guns, and four 355.6-mm (14-in) torpedo tubes

Armour: protective deck 152.4 mm (6 in) tapering to 76.2 mm (3 in); casemates 152.4 mm (6 in); barbettes 177.8 mm (7 in)

Complement: 570



The Naval Defence Act of 1889 led to a considerable expansion of the Royal Navy's cruiser force. HMS Blake *was the precursor of the armoured cruiser designs of the turn of the century, introducing maindeck casemates and what was to be standard British armament.*



Designed primarily as flagships for squadrons on distant stations and trade protection, the 'Blakes' were armed with 233.7-mm (9.2-in) chasers fore and aft and a main battery of 10 152.4-mm (6-in) guns. Obsolete by 1914, they were destined never to see action.

UK

'Cressy' class

With the six **'Cressy' class** ships (HMS ***Aboukir***, ***Bacchante***, ***Cressy***, ***Euryalus***, ***Hogue*** and ***Sutlej***), the armoured cruiser proper re-entered the Royal Navy list, though the type had continued to be built abroad during the 13-year British hiatus. These were belted and improved 'Diadems', their longer hulls allowing more efficient driving. They also continued the fashion of the 'Powerfuls' in a major-calibre chase gun forward and aft, and an entirely casemated secondary battery which, while protected, had its lower casemates so low as to be unusable in any sea. This basic design fault was common through many classes.

Extra armour amounted to about 1,200 tons, absorbed mostly by a 152.4-mm (6-in) belt, stretching from a point 36.6 m (120 ft) from the bows to another some 27.4 m (90 ft) from the stern, tied athwartships by 127-mm (5-in) bulkheads. The 'soft' ends, of no more than 50.8-mm (2-in) plate, were widely criticized. The main protective deck was lighter than in the 'Diadems' as it was no longer considered the primary shield. Armour was made by the Krupp cemented process and, strength-for-strength, was lighter than earlier plate. the ships were launched between 1899 and 1901.

On some of the class, windscoops replaced the ranks of familiar cowl ventilators; the idea was to reduce the profile offered to high-explosive shells. Another innovaton was the use of fire-proofed wood which, reportedly, was unpopular on the grounds that, if uniforms were stored in furniture made of it, their gold braid deteriorated!

It is the tragic record of this class that it is remembered most often for having lost three of its number within 90 minutes. Five of them were attached to the 7th Cruiser Squadron at the Nore, with the primary duties of supporting the Harwich Force and covering the northern approaches to the English Channel. On 22 September 1914, with a disdainful disregard of the already well-appreciated threat from submarine attack, the *Aboukir*, *Cressy* and *Hogue* were patrolling a narrow corri-

Origins of the Armoured Cruiser

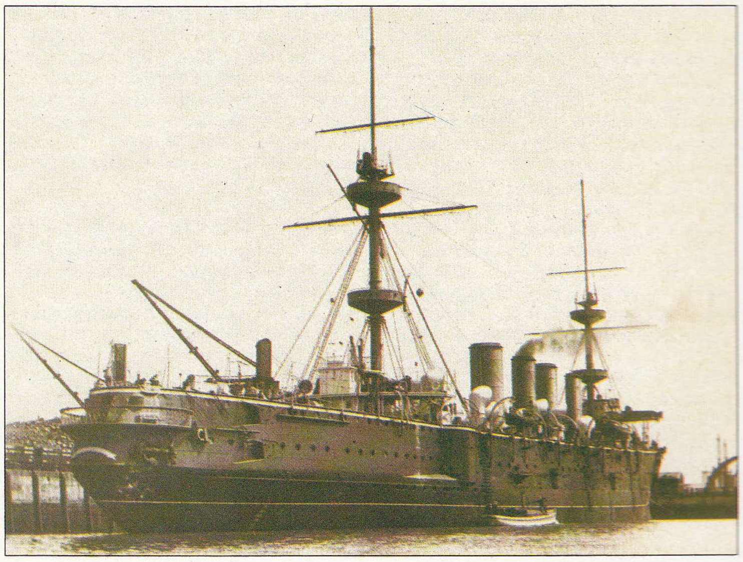
Cruisers were not only the 'eyes of the fleet' but were designed to exercise, or indeed challenge, control of the ocean trade routes. Their design was a delicate balance between speed, protection and armament, with varying emphasis leading to a bewildering variety of cruiser categories.

As battlefleets of the 19th century were built to decide both wars at sea and the destiny of the states whose flags they wore, it was here that the money was spent and here that the great revolutions in warship development had most effect.

Less glamorous were the considerable fleets of cruising ships maintained by imperial powers to police their overseas possessions and guarantee free navigation on their vital trade routes. For these 'cruisers' the principal assets were self-sufficiency, flexibility and endurance. Heavy armament was not deemed necessary as their main defence lay in their flag and the power it represented. With machinery still inefficient and coal stocks uncertain, sail was still retained for both utility and smartness. Wooden hulls were undeniably more comfortable than iron under the hot sun of the tropics. Thus had developed a heterogeneous collection of powered and unpowered frigates, corvettes and sloops.

Mainstream evolution, meanwhile, had produced the steam-powered singledecker of metal construction which, though technically a frigate, completely outclassed any line-of-battle ship of the traditional navy. The cost and effort involved in the rapid increase in the numbers of these was another reason for the Royal Navy's cruising fleet to remain little changed.

The American Civil War saw effective use of the large cruiser that could be used not only against commerce but also to hunt down other cruisers. Always keen on the ideas of war against seaborne trade, the French also built the type, though it took the powerful Russian 'General Admiral' design of 1870 to prompt a British reply. This was HMS *Shannon* of 1877 which, in contrast with earlier steam frigates, was heavily protected, having not only a substantial vertical belt but also a protective deck. She began the vogue for ships as large as second-class battleships and capable of dispute with one. On paper their ultimate defence lay in their speed but, practically, the margin was negligible, the scale of armour and armament making them extremely sluggish. This lack of performance precluded their practical use with the main battlefleet and guaranteed their employment as flagships on distant stations.

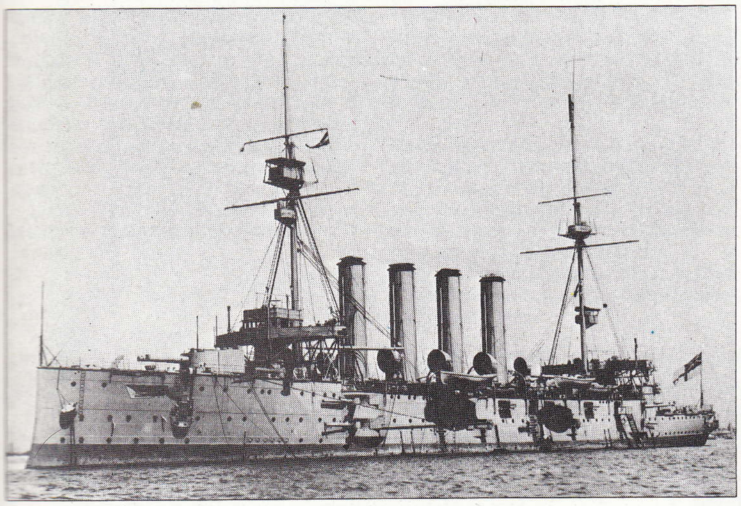


HMS Powerful *was built in response to a perceived Russian cruiser threat. Fast and long-ranged, she was under-armed, and the imbalance of her design led to the 'Diadem' class and thence to a generation of armoured cruisers proper.*

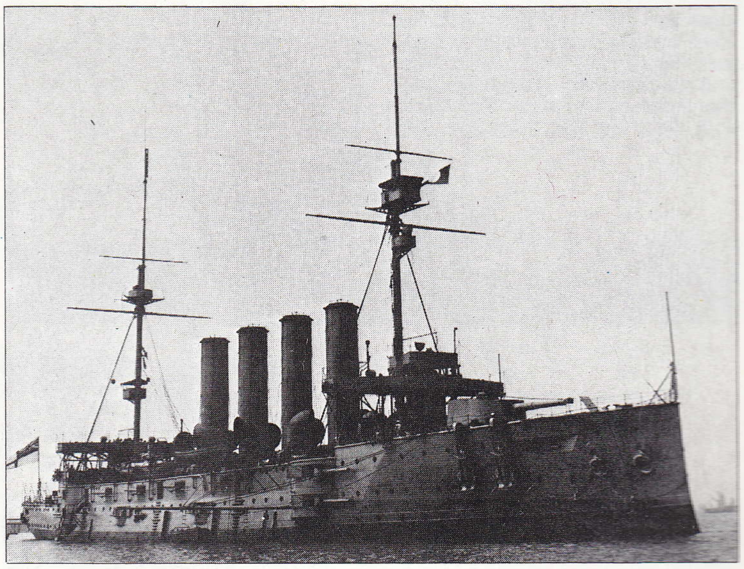
Speed could be bought only at the expense of protection and, for a period, the protected cruiser held sway. Typical of these were the two 'Blenheims' of 1889-90, comparable in length with a 'Royal Sovereign' class battleship but lacking her heavy main battery, the hull being slimmer and packing in a 50 per cent increase in power.

No longer able to engage a modern battleship, the large cruiser was beginning to bear the same relationship to it as had a sailing frigate to a ship of the line.

With the introduction of improved armour at the turn of the century, it was again possible to think in terms of adding a vertical belt in addition to protective decks. Thus the 'Cressy' class adopted the basic 'Diadem' design of protected cruiser of 1896-8 but with redistributed armour which added considerably to the displacement. Further weight was added in shipping centreline guns of a calibre larger than those mounted in casemates. This fashion for two major calibres was justified on the grounds that the ships would need to work with the battlefleet, and the fashion persisted until the armoured cruiser was superseded in 1908 by the battle-cruiser.



With the Cressy *and her five sisters, the armoured cruiser reappeared in the* Royal Navy. *The armament of the 'Powerfuls' was retained – two large chase guns and a casemated secondary battery – but the lower casemates were so low as to be unusable in any sea.*



The fate of Cressy *was a terrible portent for the future. Steaming slowly in a straight line off the Dutch coast with two of her sisters,* Hogue *and* Aboukir, *she was attacked by the German submarine* U-9. *All three cruisers were sunk, one after the other, with the loss of 1,500 men.*

dor between minefields and the Dutch coast, unescorted, at low speed and without zigzagging. At 06.30 the *Aboukir* was torpedoed. Assuming that she had been mined the others stopped to render assistance. All were torpedoed, all were sunk, and nearly 1,500 men died. Weddigen's old submarine *U-9* had done for them all, greatly influencing both British and German ideas on the possibilities of submarine warfare.

Specification
'Cressy' class

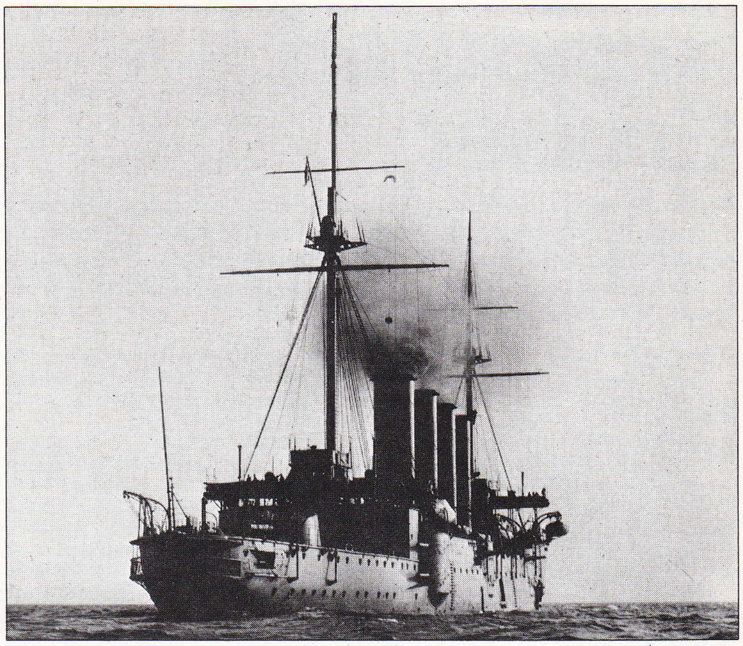
Displacement: 11,700 tons standard
Dimensions: length 143.87 m (472.0 ft); beam 21.18 m (69.5 ft)
Propulsion: two sets of triple-expansion steam engines delivering 15660 kW (21,000 ihp) to two shafts
Speed: 21 kts
Armament: two 233.7-mm (9.2-in), 12 152.4-mm (6-in) and 13 12-pdr guns, and two 457.2-mm (18-in) torpedo tubes
Armour: belt 152.4(6 in) tapering to 50.8 mm (2 in); transverse bulkheads 127 mm (5 in); protective deck 76.2 mm (3 in) tapering to 38.1 mm (1.5 in); barbettes 152.4 m (6 in); casemates 127 mm (5 in)
Complement: 755

UK

'Drake' class

Where the 'Cressys' had managed to stow the armament of the 'Powerfuls' on a considerably shorter and cheaper hull, they were too short to be capable of more than 21 kts. Battleships were getting faster, so armoured cruisers were still experiencing a speed problem and, to accommodate power for the desired 23 kts (HMS ***King Alfred*** averaged 24.8 kts for eight hours in 1907) the four **'Drake' class** that followed were again of a size with the 'Powerfuls'. Together with the *King Alfred* these were HMS ***Drake***, ***Good Hope*** and ***Leviathan***. They lacked the great freeboard and general bulky appearance of the 'Powerfuls', helped by being cut-down by one deck aft and adopting the new all-grey paint scheme. The four tall funnels were well-proportioned and uninterrupted by ventilator cowls, giving the profile a feeling of grace and power, yet emphasizing the almost complete lack of superstructure. As with all of their type, when completed in 1902-3 the masts were of enormous height and of three sections to give elevation to radio aerials, semaphore and gaffs and yards for flag signals. Though double-decked casemated armament was, from exercises, already well understood to be of little use, they were still included to house the 16 152.4-mm (6-in) guns deemed necessary. Another carry-over from mistaken thinking of the past was the ram bow; its existence had never and was never to be justified, and its only real use was to increase the waterline length of the ship.

The poor showing of the *Good Hope* at Coronel has been described elsewhere. Outclassed as she was, she could have done better with a fully worked-up regular crew and a better tactical sense on the part of Craddock. The only other loss in the class was the *Drake* herself. With the greater majority of the now-obsolete armoured cruisers, she was involved in the Atlantic convoy business. On 2 October 1917, having just dispersed an inward convoy, she was torpedoed by a submarine near Rathlin Island. A substantial escort materialized for her and she actually reached a secure anchorage, only to capsize and become a total loss.



Despite the poor showing of her sister* Good Hope *at Coronel,* Drake *was a worthy successor to the 'Cressys'. But her design was still bedevilled by outdated ideas; the ram served no serious purpose, and the ineffective lower casemates were retained regardless of their proven failure.

Specification

'Drake' class

Displacement: 14,100 tons standard

Dimensions: length 161.39 m (529.5 ft); beam 21.64 m (71.0 m); draught 8.23 m (27.0 ft)

Propulsion: two sets of triple-expansion steam engines delivering 23117 kW (31,000 ihp) to two shafts

Speed: 23 kts

Armament: two 233.7-mm (9.2-in), 16 152.4 (6-in) and 14 12-pdr guns, and two 457.2-mm (18-in) torpedo tubes

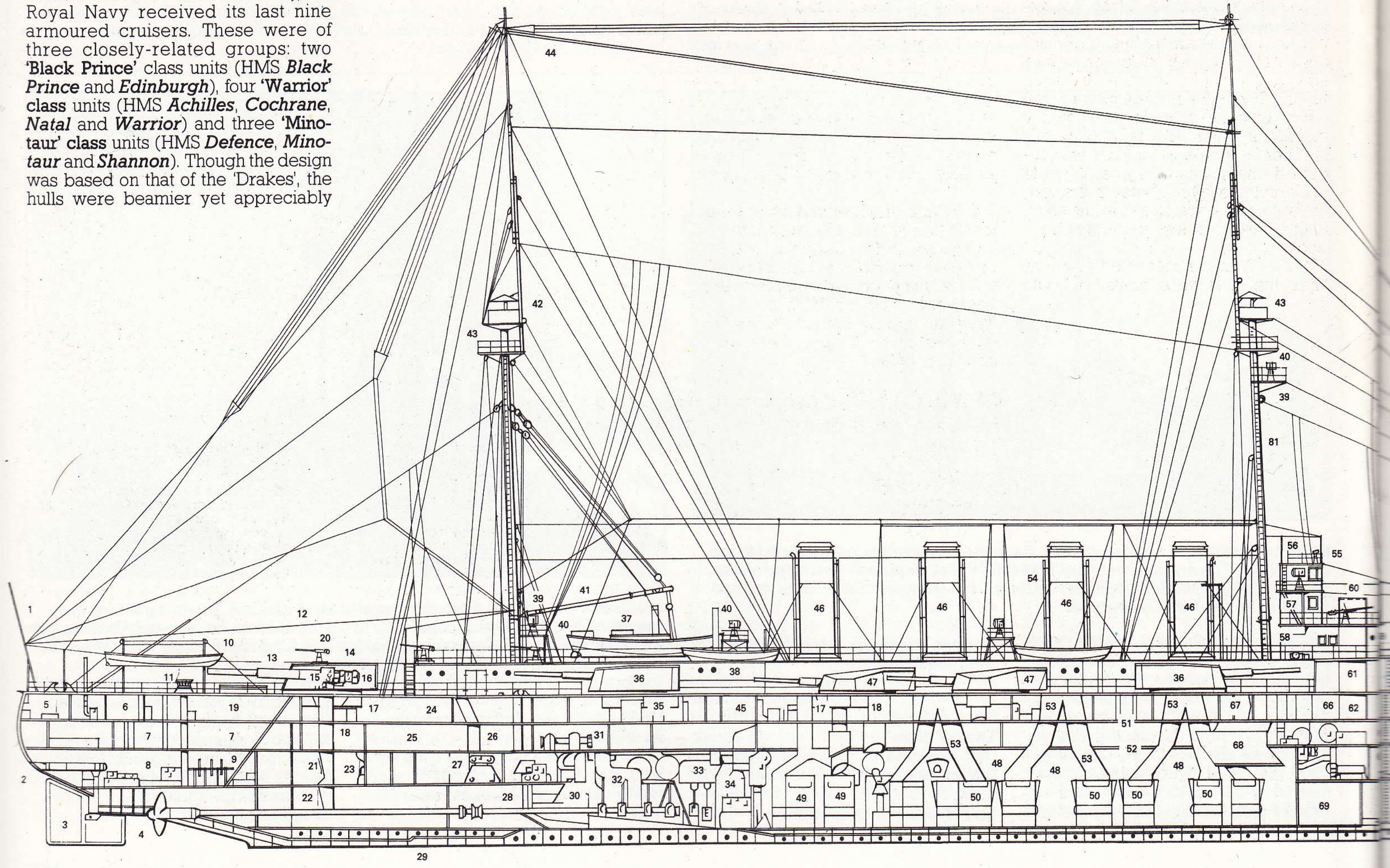
Armour: belt 152.4 mm (6 in) tapering to 76.2 mm (3 in); transverse bulkhead 127 mm (5 in); protective deck 76.2-50.8 mm (3-2 in)

Complement: 900

UK

'Black Prince', 'Warrior' and 'Minotaur' classes

Between 1906 and 1908 (when its first battle-cruiser was commissioned), the Royal Navy received its last nine armoured cruisers. These were of three closely-related groups: two **'Black Prince' class** units (HMS ***Black Prince*** and ***Edinburgh***), four **'Warrior' class** units (HMS ***Achilles***, ***Cochrane***, ***Natal*** and ***Warrior***) and three **'Minotaur' class** units (HMS ***Defence***, ***Minotaur*** and ***Shannon***). Though the design was based on that of the 'Drakes', the hulls were beamier yet appreciably



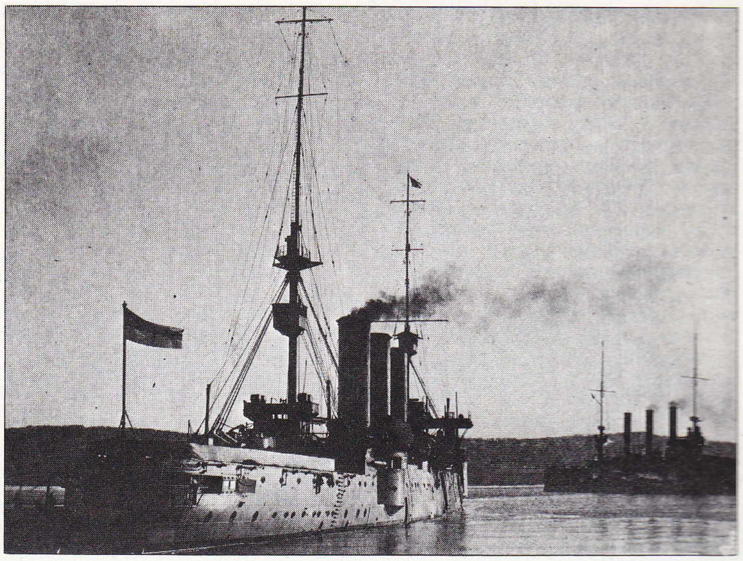
UK

'County' class

The only three-funnelled armoured cruisers in the Royal Navy, the high sided **'County' class** were second-class ships aimed primarily at commerce protection. As such they had 152.4-mm (6-in) armament, a total of 14 guns being carried. Of these, however, four were in two experimental and trouble-prone twin turrets and six were in uselessly low casemates, factors which contributed to the poor showing of the *Monmouth* at Coronel. During the war, several had their lower casemated guns resited on the upper deck.

As trade-protection cruisers, the armour of the 'Counties' was also on a light scale. The belt was a maximum 101.6 mm (4 in) in thickness, tapering to half that forward and terminating beyond the after casemates. Speed was a major consideration, and most could manage 24 kts when pressed. As their length was limited, the production of lines capable of being driven at this speed did credit to the still-developing science of ship hull design. The class comprised HMS ***Bedford***, ***Berwick***, ***Cornwall***, ***Cumberland***, ***Donegal***, ***Essex***, ***Kent***, ***Lancaster***, ***Monmouth*** and ***Suffolk***. Of the 10 built one, the *Bedford*, was wrecked in 1910; the *Monmouth*, disabled by SMS *Gneisenau* at Coronel, was finished off by the light cruiser SMS *Nürnberg*. It fell to her sister, the *Kent*, to avenge her at the Falklands in December 1914. With Sturdee's battle-cruisers devoted to the pursuit and destruction of von Spee's two armoured cruisers, the smaller British units were sent on a general chase after the enemy light cruisers, detached to shift for themselves. The *Kent*, a poor steamer, found herself chasing the *Nürnberg*, nominally faster but long out of dock. The *Kent* forced her fires with wood, reputedly the wardroom furniture, and managed a previously unheard-of 25 kts, slowly overhauling her quarry. For a while there was discomfiture when it was found that the forward 152.4-mm guns, superior in both calibre and elevation, were being outranged by the *Nürnberg*'s after 105-mm (4.1-in) armament. For some time the *Kent* was unable to reply to increasingly accurate fire but the German's ailing machinery finally failed under the strain and she was overwhelmed and sunk. The *Cornwall*, meanwhile, had assisted the *Glasgow* in despatching SMS *Leipzig*.

Lying peacefully in Vladivostok, HMS **Suffolk** ***(left) is seen here with USS*** **Brooklyn.** ***The 'County' class had a chequered history:*** **Monmouth** ***was lost at Coronel, but*** **Kent** ***took part in the battle of the Falklands, where by exceeding her designed speed she caught and sank the*** **Nürnberg.**



Specification

'County' class

Displacement: 9,800 tons standard

Dimensions: length 141.27 m (463.5 ft); beam 20.12 m (66.0 ft); draught 7.47 m (24.5 ft)

Propulsion: two sets of triple-expansion steam engines delivering 16405 kW (22,100 ihp) to two shafts

Speed: 23 kts

Armament: 14 152.4-mm (6in) and 10 12-pdr guns, and two 457.2-mm (18-in) torpedo tubes

Armour: belt 101.6 mm (4 in) tapering to 50.8 mm (2 in); transverse bulkheads 127 mm (5 in); protective deck 50.8 mm (2 in); barbettes 127 mm (5 in); casemates 101.6 mm (4 in)

Complement: 687

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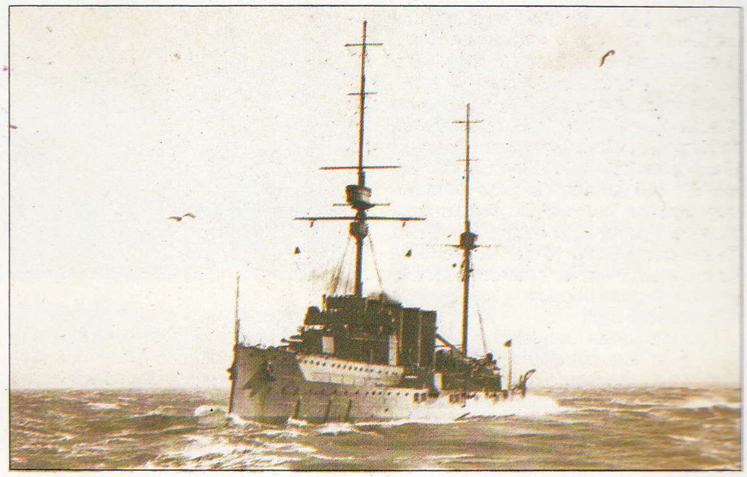
shorter, with the belt continued on a lighter scale right to the stern.

Like the 'Drakes', the 'Black Princes' completed in 1906 had a mixed 233.7-mm and 152.4-mm (9.2-in and 6-in) armament, but took six of the former arranged in single turrets in a hexagon layout. Ten 152.4-mm guns were set impossibly low in single casemates at maindeck level but, as long as this number of single mountings was required, there was little alternative to this defective layout. Later in the war, the casemate were plated-in and some of their weapons resited on the upper deck.

In the 'Warriors' that followed a year later, the hulls were similar but with slightly improved horizontal protection. The great difference was in the reduction of the number of guns. Six 233.7-mm guns were carried in a similar arrangement to that of the previous class, but with two 190.5-mm (7.5-in) guns on each beam in single turrets. These could be sited at upper deck level, worked in any weather and still throw 80 per cent of the broadside weight of the earlier five 152.4-mm weapons. If, however, it is accepted

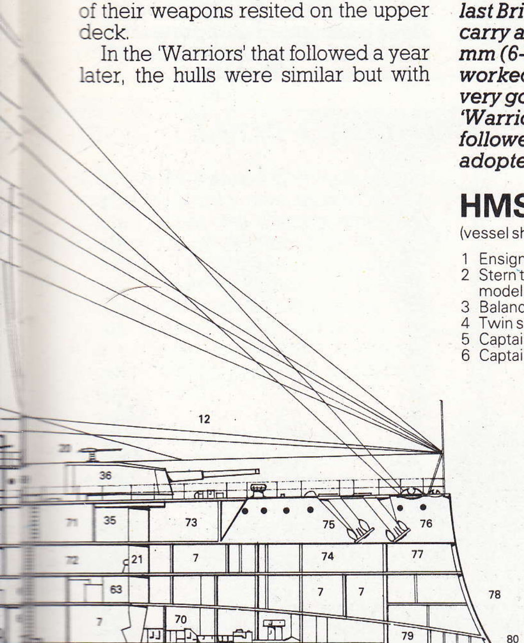
Black Prince ***and her sister were the last British armoured cruisers to carry a secondary battery of 152.4-mm (6-in) guns that could not be worked in any seaway; neither were very good sea boats. With the 'Warrior' and 'Minotaur' classes that followed, a sensible gun layout was adopted at last.***



HMS *Achilles* cutaway drawing key

(vessel shown as completed, with short funnels and original tall masts)

1 Ensign mast
2 Stern torpedo tube (1904 model)
3 Balanced rudder
4 Twin screws
5 Captain's cabin
6 Captain's pantry
7 Stores etc
8 Steering engine
9 Winch engine
10 Gig
11 Capstan
12 Middle awning ridge
13 234-mm (9.2-in) Mk XI 50-calibre gun barrel
14 Turret
15 Saddle
16 Breech
17 Turntable
18 Turret machinery
19 Wardroom
20 3-pdr semi-automatic gun
21 Ammunition hoist
22 Magazine
23 Hoist machinery
24 Officers' quarters
25 Engineers' quarters
26 Armoured access tube
27 Auxiliary engine
28 Inspection pit
29 Double bottom
30 Turbine reduction gear
31 Dynamo
32 Starboard engine room
33 Four-cylinder triple expansion engine
34 Feed water tank
35 Barbette
36 Twin 234-mm (9.2-in) gun turret
37 Steam launch
38 Lifeboat
39 Searchlight platform
40 Searchlight
41 Boat handling derrick
42 Mainmast
43 Spotting top
44 Wireless aerials
45 Machine shop
46 Funnel
47 Twin 190-mm (7.5-in) Mk II 50-calibre guns
48 Boiler room
49 Cylindrical boilers
50 Yarrow large tube boilers
51 Upper armoured deck
52 Lower armoured deck
53 Funnel uptakes
54 Steam pipes
55 Upper bridge
56 Compass platform
57 Navigation room
58 Wireless room
59 Chart room
60 Armoured conning tower
61 Access to conning tower
62 Lower armoured command centre
63 Auxiliary machine shop
64 Dynamo
65 Fuel pump
66 Sailors' mess
67 Upper armour belt
68 Lower armour belt
69 Coal bunkers
70 Ammunition hoist machinery
71 Sailors' quarters
72 Canteen
73 Main deck
74 Cable store
75 Anchor wells
76 Anchors
77 Paint store
78 Waterline
79 Sloping armoured deck
80 Ram bow
81 Foremast

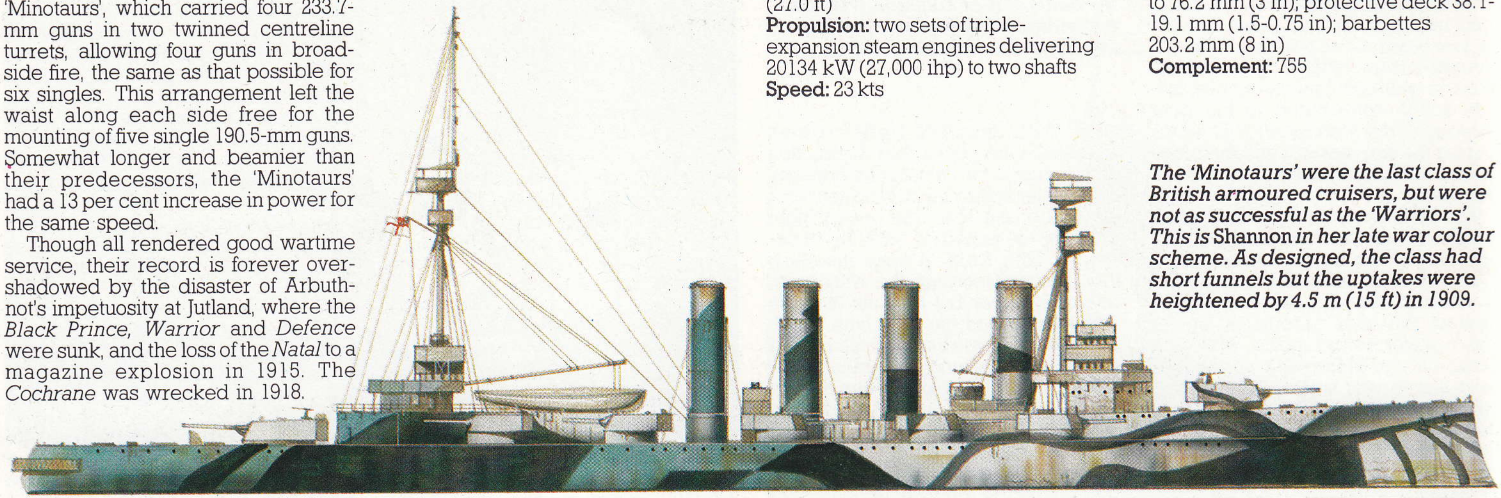


that the main function of the secondary battery was to fight off torpedo attacks then five well-sited 152.4-mm QF had to be superior to two 190.5-mm guns.

The final refinement came with the 'Minotaurs', which carried four 233.7-mm guns in two twinned centreline turrets, allowing four guns in broadside fire, the same as that possible for six singles. This arrangement left the waist along each side free for the mounting of five single 190.5-mm guns. Somewhat longer and beamier than their predecessors, the 'Minotaurs' had a 13 per cent increase in power for the same speed.

Though all rendered good wartime service, their record is forever overshadowed by the disaster of Arbuthnot's impetuosity at Jutland, where the *Black Prince, Warrior* and *Defence* were sunk, and the loss of the *Natal* to a magazine explosion in 1915. The *Cochrane* was wrecked in 1918.

Specification
'Minotaur' class
Displacement: 14,600 tons standard
Dimensions: length 158.19 m (519.0 ft); beam 22.71 m (74.5 ft); draught 8.23 m (27.0 ft)
Propulsion: two sets of triple-expansion steam engines delivering 20134 kW (27,000 ihp) to two shafts
Speed: 23 kts
Armament: four 233.7-mm (9.2-in), 10 190.5-mm (7.5-in) and 14 12-pdr guns, and five 457.2-mm (18-in) torpedo tubes
Armour: belt 152.4 mm (6 in) tapering to 76.2 mm (3 in); protective deck 38.1-19.1 mm (1.5-0.75 in); barbettes 203.2 mm (8 in)
Complement: 755



The 'Minotaurs' were the last class of British armoured cruisers, but were not as successful as the 'Warriors'. This is Shannon *in her late war colour scheme. As designed, the class had short funnels but the uptakes were heightened by 4.5 m (15 ft) in 1909.*

FRANCE

'Amiral Charner' class

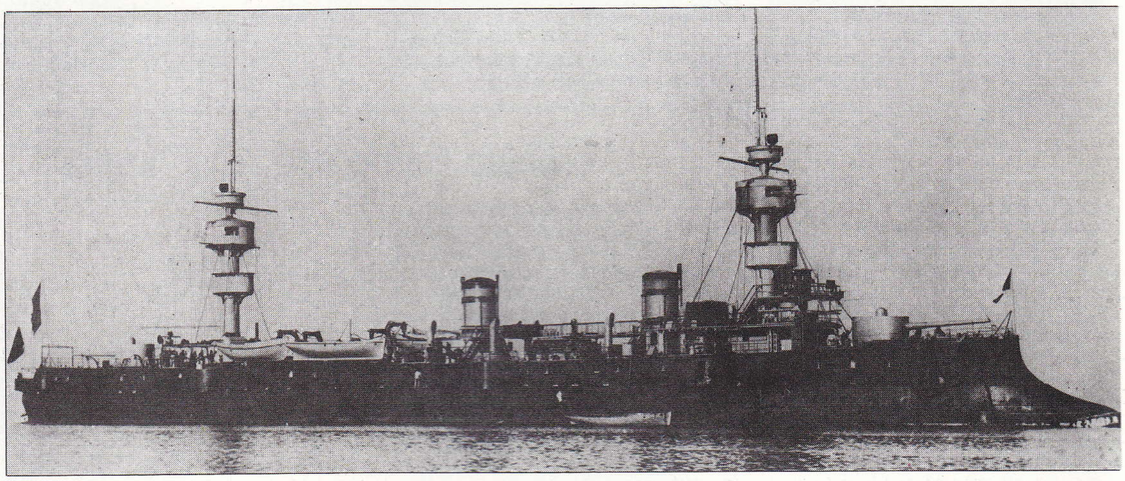
Most elderly of the armoured cruisers to wear the French tricolore flag in World War I were the three **'Amiral Charner' class** ships ***Amiral Charner, Bruix*** and ***Latouche-Tréville***, completed in 1895-6. A fourth, ***Chanzy***, had been lost in 1907. Their design was derived directly from that of the pioneering *Dupuy de Lôme* of 1893. The UK was having a 'holiday' from armoured cruiser construction at this time and, despite the fact that these ships were openly constructed with *guerres de course* (commerce-raiding campaigns) in mind, it was considered that the British protected cruisers of the day could match them. This was hardly true for though their contemporaries, the 'Hermiones', had a knot or so speed advantage they also had far lighter armament and, to tackle a Frenchman, would have needed to approach close enough to rue the lack of a vertical belt.

French ideas included a vertical belt over the complete length, employing exaggerated 'tumblehome' to give guns the maximum fields of fire, and protruding bows and sterns of hysterical aspect to increase the waterline length.

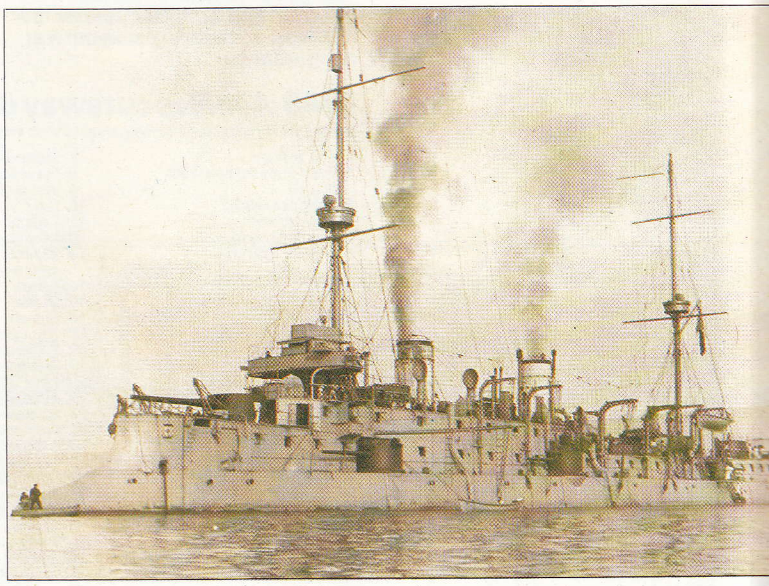
Where the *Dupuy de Lôme* had considerable armoured freeboard and was powered for a useful 20 kts, the 'Charners' were more modest and used a low-freeboard protected hull with wide side decks flanking a full-length unarmoured deckhouse. Along the length of the side decks were deep armoured casemates for guns of some 138-mm (5.43-in) calibre. In the accepted style, two large guns (194-mm/7.64-in calibre) were sited one forward and one aft; so short was the forecastle that the muzzle of the gun protruded almost to the stemhead. A similar armament layout was adopted later by the British, though the 'Charners' did not follow the example of the *Dupuy de Lôme* which had its two large guns sited amidships and the six smaller weapons in groups of three on both foredeck and quarterdeck.

The design was taken one stage further in the one-off ***Pothuau***, which was higher-powered and slightly larger, and equipped with a further pair of secondary-calibre guns on each side. Four were casemated and two were set in shields on pronounced sponsons.

Specification
'Amiral Charner' class
Displacement: 4,700 tons standard
Dimensions: length 110.0 m (360.89 ft); beam 14.0 m (45.93 ft); draught 6.0 m (19.69 ft)
Propulsion: two sets of triple-expansion steam engines delivering 6189 kW (8,300 ihp) to two shafts
Speed: 18.5 kts
Armament: two 194-mm (7.64-in) and six 138-mm (5.43-in) guns, and four 450-mm (17.72-in) torpedo tubes
Armour: belts 90 mm (3.54 in) tapering to 70 mm (2.76 in); protective deck 65 mm (2.56 in) with 55-mm (2.17-in) ends; barbette and casemates 90 mm (3.54 in)
Complement: 380

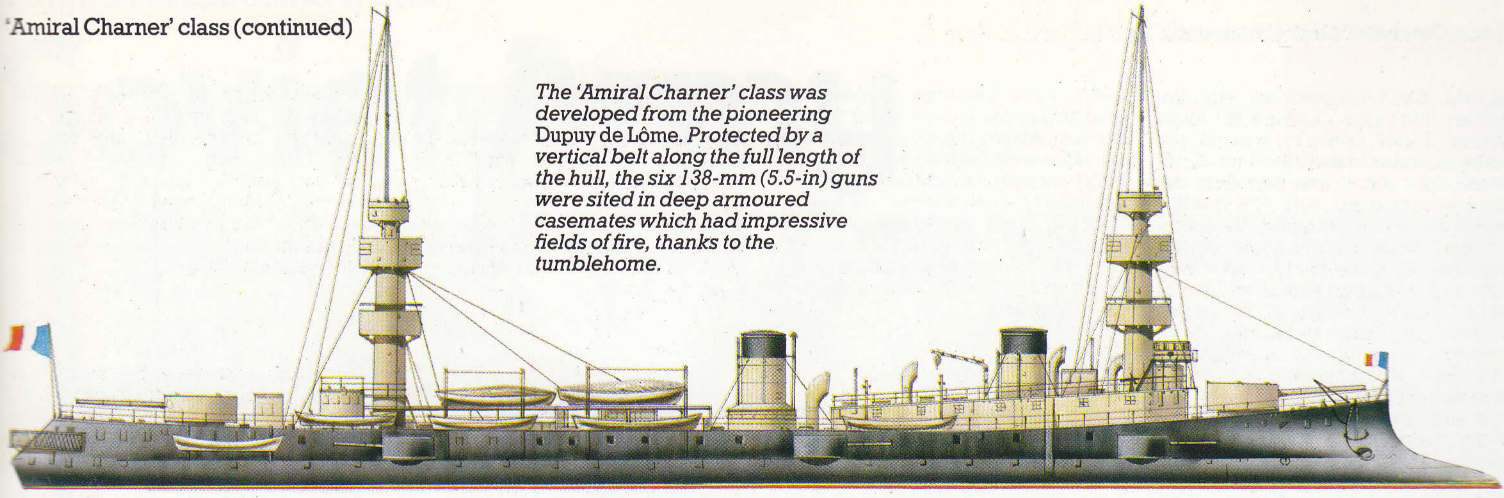


Above: Latouche-Treville *was one of three commerce-raiding cruisers built in the 1890s which were still in service during World War I.*



Seen here off Salonika in December 1915, Bruix *displays the exaggerated tumblehome that was the hallmark of French warship design. When completed,* Bruix *was more than a match for contemporary British cruisers like the* Hermiones.

'Amiral Charner' class (continued)



The 'Amiral Charner' class was developed from the pioneering Dupuy de Lôme. *Protected by a vertical belt along the full length of the hull, the six 138-mm (5.5-in) guns were sited in deep armoured casemates which had impressive fields of fire, thanks to the tumblehome.*

FRANCE

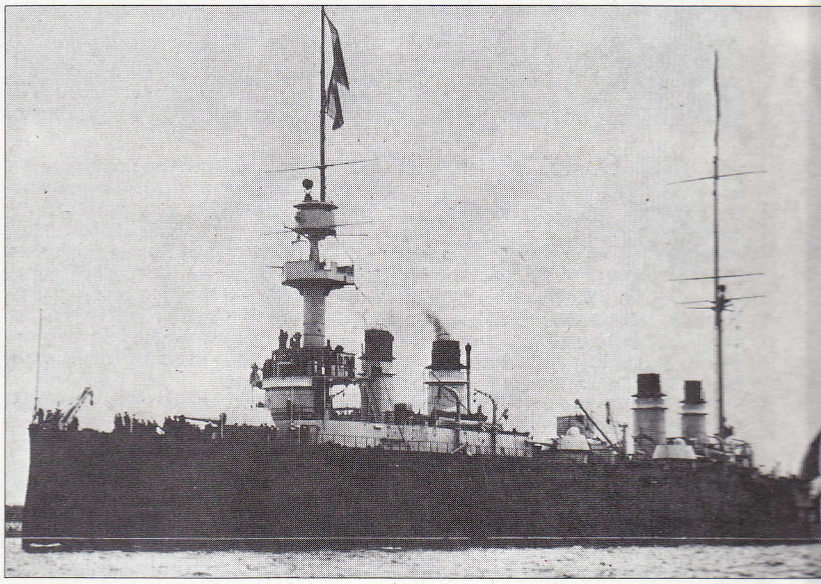
'Kléber', 'Gueydon' and 'Aube' classes

In 1899 the French launched the ***Jeanne d'Arc***, an equivalent to the British 'Powerfuls'. Though smaller she was, like the latter, a prodigious eater of coal, and she exerted a strong influence on later ships.

Launched in 1900-2, the three **'Kléber' class** armoured cruisers (***Dupleix, Desaix*** and ***Kléber***) were intermediate between this monster and the *Pothuau* and, by the standards of the day, were quite lightly armed, their eight main-battery guns being disposed in four twin turrets, one forward, one aft and one on each beam. This adoption of the twin mounting was exactly contemporary with that in the Royal Navy's 'Counties'. By Gallic standards quite pleasing in appearance, the 'Klébers' had four funnels in two widely-spaced pairs, each pair exhausting a space containing 10 boilers. The *Kléber* was a war loss.

Contemporary with the 'Klébers' were the three larger **'Gueydon' class** cruisers. With a length of 138 m (452.76 ft), these 9,500-ton ships had a thick belt of greater depth than that of the 'Klébers' and running nearly the length of the ship. Indeed, the 'Klébers' ran contrary to normal French practice with their meagre area of belt. The 'Gueydons', too, had eight 164.4-mm (6.47-in) guns, but all were casemated effectively at upper deck level on a high-freeboard hull. In addition they had a single centreline 194-mm (7.64-in) piece at each end. Though the ***Dupetit-Thouars*** was torpedoed and sunk in 1918 her two sisters, surprisingly, survived in auxiliary capacities until World War II.

The five **'Aube' class** ships of 1900-2 were derivatives of the 'Gueydons'. The ***Marseillaise, Gloire, Sully, Condé*** and ***Amiral Aube*** were slightly longer, beamier and better protected. These carried four of their secondary guns at a level one deck higher. Like their predecessors they were triple-screwed, an arrangement that made them handle unpredicatably at low speeds. The *Sully* was wrecked in 1905, and the others were deleted in the 1920s.



Gloire *was one of the 'Aube' class, good steamers that were derived from the 'Gueydons'. A fifth member of the class,* Sully, *was wrecked in February 1905 but the other four served throughout the war.*

Specification

'Kléber' class

Displacement: 7,650 tons standard

Dimensions: length 130.0 m (426.51 ft); beam 17.75 m (58.23 ft); draught 7.40 m (24.28 ft)

Propulsion: three set of triple-expansion steam engines delivering 13050 kW (17,500 ihp) to three shafts

Speed: 21 kts

Armament: eight 164.4-mm (6.47-in), four 100-mm (3.94-in) and 10 47-mm (1.85-in) guns, and two 450-mm (17.72-in) torpedo tubes

Armour: belt 100 mm (3.94 in) tapering to 75 mm (2.95 in); protective deck 65 mm (2.56 in); barbettes 90 mm (3.54 in)

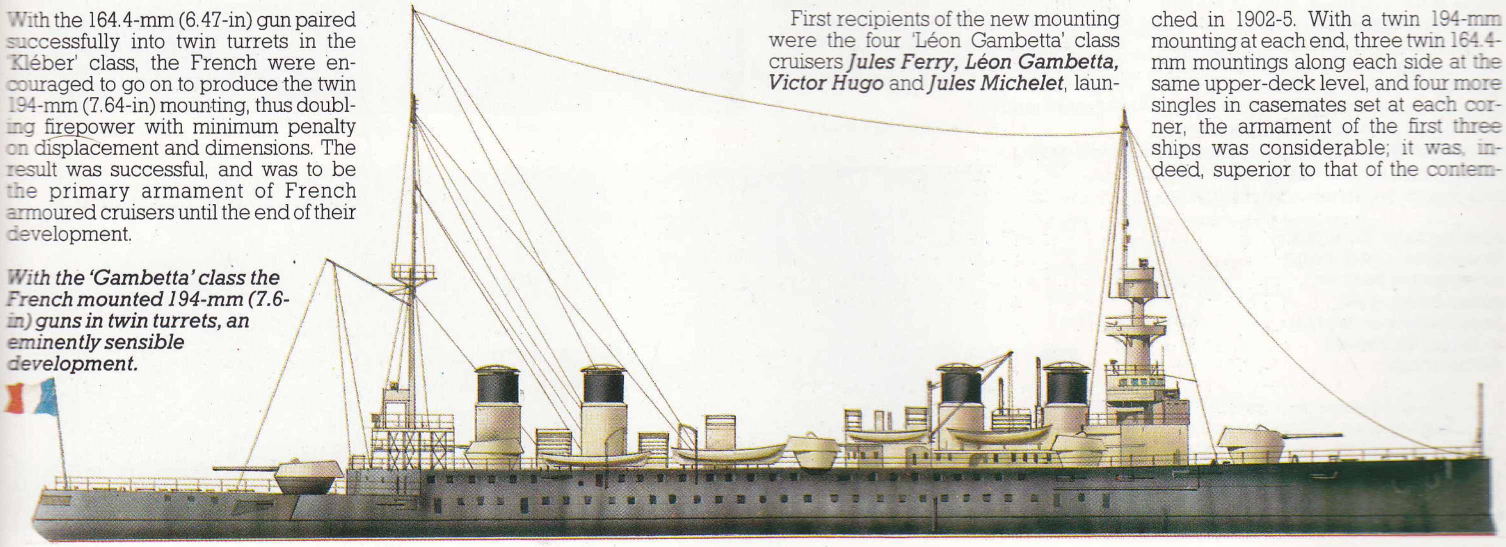
Complement: 570

FRANCE

'Léon Gambetta' class

With the 164.4-mm (6.47-in) gun paired successfully into twin turrets in the 'Kléber' class, the French were encouraged to go on to produce the twin 194-mm (7.64-in) mounting, thus doubling firepower with minimum penalty on displacement and dimensions. The result was successful, and was to be the primary armament of French armoured cruisers until the end of their development.

First recipients of the new mounting were the four 'Léon Gambetta' class cruisers ***Jules Ferry, Léon Gambetta, Victor Hugo*** and ***Jules Michelet***, launched in 1902-5. With a twin 194-mm mounting at each end, three twin 164.4-mm mountings along each side at the same upper-deck level, and four more singles in casemates set at each corner, the armament of the first three ships was considerable; it was, indeed, superior to that of the contem-

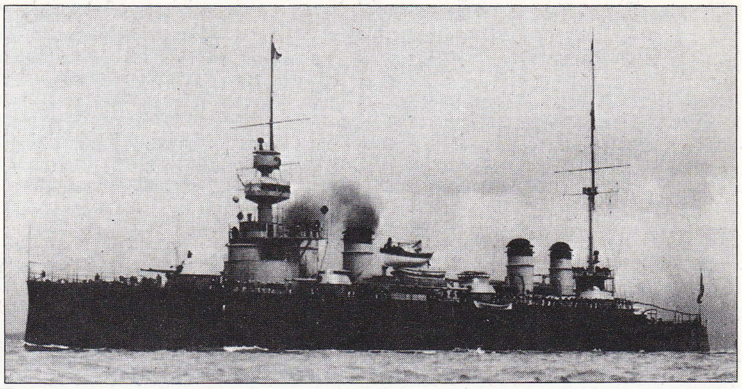


With the 'Gambetta' class the French mounted 194-mm (7.6-in) guns in twin turrets, an eminently sensible development.

porary British 'Devonshires', with the further advantage of being set much higher. Speed, however, was one parameter against which the French set much store and, in this, they were deficient compared with the smaller Royal Navy ships. Supposedly, therefore, to improve speed, the fourth and last unit, the *Jules Michelet*, sacrificed four secondary barrels but, as this was done by substituting eight single turrets for six twins, there was a net increase of displacement. One can only conclude, therefore, that the measure was aimed primarily at dispensing with the twin turret, an opinion reinforced by the delay in the completion of the *Jules Michelet* until 1908, the same year as the one-off follow-on ***Ernest Renan***, which carried a precisely similar armament. As a measure to increase the speed of the latter, however, she had about 28 per cent greater installed power, requiring a 9-m (29.5-ft) increase in length and two groups of three funnels. A feature of all the French armoured cruisers was their large bunker capacity for colonial service. Above the long armour belt the sides were pierced with numerous large, rectangular scuttles to improve habitability. Their war service was active but none was ever given the chance to prove its merits in a gunnery duel with an equivalent surface target. The sole loss was the class nameship, *Léon Gambetta*.

Specification

'Léon Gambetta' class
Displacement: 12,350 tons standard
Dimensions: length 148.0 m (485.56 ft); beam 21.40 m (70.21 ft); draught 8.20 m (26.9 ft)
Propulsion: three sets of triple-expansion steam engines delivering 20505 kW (27,500 ihp) to three shafts
Speed: 22 kts
Armament: four 194-mm (7.64-in), 16 164.4-mm (6.47-in), two 65-mm (2.56-in) and 22 47-mm (1.85-in) guns, and four 450-mm (17.72-in) torpedo tubes
Armour: belt 170 mm (6.69 in) tapering to 90 mm (3.54 in); upper protective deck 35 mm (1.38 in); lower protective deck 65 mm (2.56 in); main barbettes 200 mm (7.87 in); secondary barbettes 140 mm (5.51 in)
Complement: 730



The 'Gambetta' class were excellent steamers, able to make over 17 kts on half boilers and to maintain 18 kts for 72 hours continuously. Noted for their very clear gun decks, the 'Gambettas' were better armed than their British contemporaries.

FRANCE

'Waldeck Rousseau' class

As a result of the introduction by the British of the dreadnought in 1906, followed by the battle-cruiser in 1907, the established armoured cruiser with its dual-calibre armament and comparatively low speed found itself a dated concept. The French had been very keen on the type and had developed it in a sound manner. The *Ernest Renan* was to have been the first of a trio of improved 'Gambettas', but events in the UK ensured that only the one ship was completed as planned, the other two being delayed pending developments. In the event there was little that the designers could do to revamp the hulls except install a single-calibre main battery. This they did by retaining the twin 194-mm (7.64-in) turrets at each end, by siting three single 194-mm turrets along each side, and by adding single casemated 194-mm guns at each corner. The resultant 14 barrels of this **'Waldeck Rousseau'** class (***Edgar Quinet*** and ***Waldeck Rousseau***, launched in 1907-8) were not insignificant, with nine bearing on each broadside, but its weight of 777 kg (1,713 lb) was inferior to that of the contemporary 'Minotaurs' (1143 kg/2,520 lb) or even 'Warriors' (871 kg/1,920 lb). The British ships were also credited with a similar speed on considerably less power.

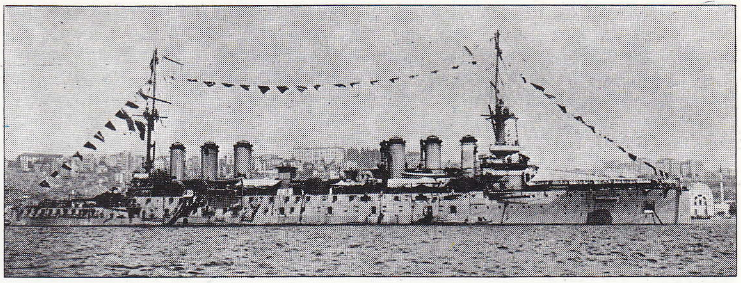
Externally, the 'Waldeck Rousseaus' were immediately distinguishable from the *Renan* and *Jeanne d'Arc* by the fully-cased funnels of equal height and unequal section. Again six were set in two groups of three, exhausting 40 Niclausse large-tube boilers which had been reintroduced following many problems with the small-bore du Temple Guyots, of which only half the number needed to be carried.

The wide separation of the boiler spaces was due to the engine room being set between them. Above this, all French armoured cruisers had a prominent rectangular 'pillbox' for the forced ventilating system, an alternative to the many cowls or windscoops on British ships.

Obsolete or not, the ships were still far from old at the Armistice and were kept on until the 1930s, the *Edgar Quinet* being wrecked off Algeria in 1930 while serving as a training ship.

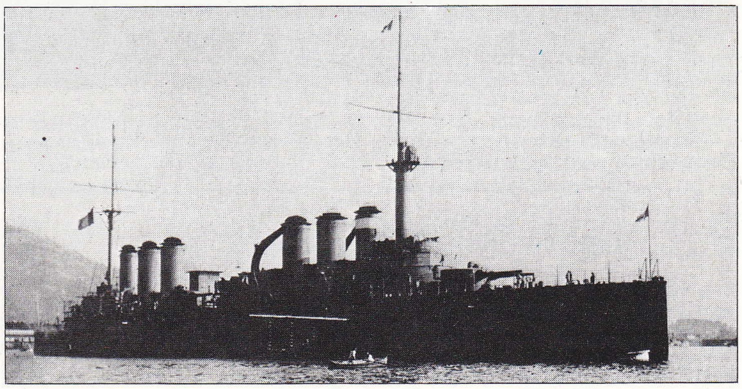
Specification

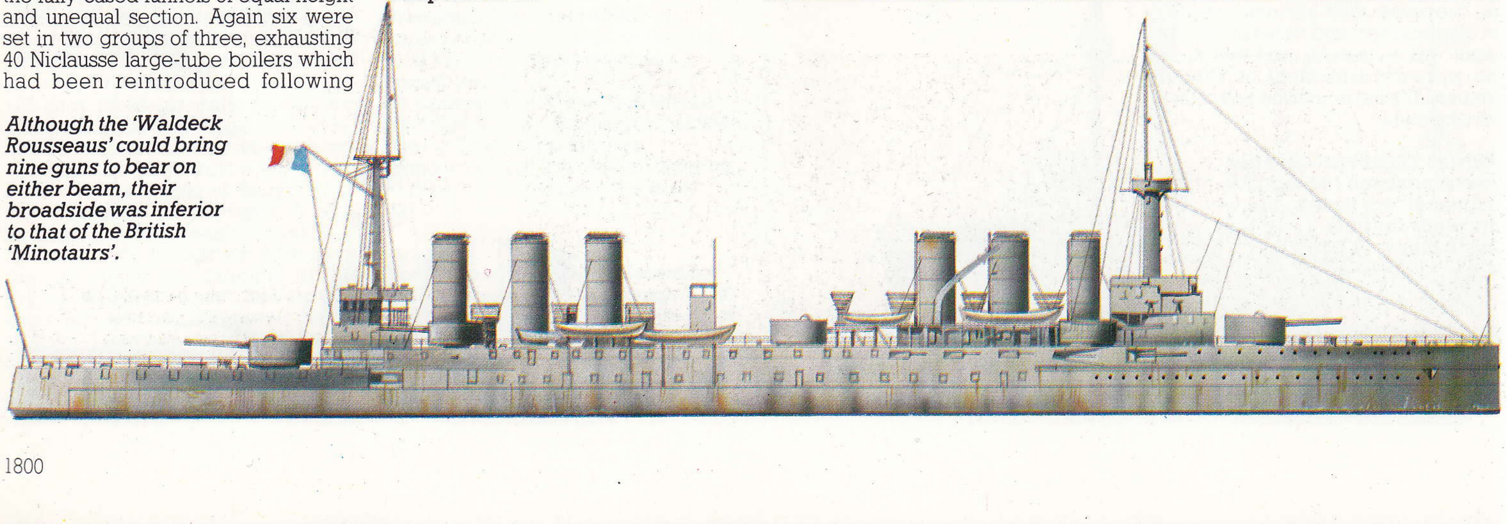
'Waldeck Rousseau' class
Displacement: 13,750 tons standard
Dimensions: length 159.0 m (521.65 ft); beam 21.40 m (70.21 ft); draught 8.40 m (27.56 ft)
Propulsion: three sets of triple-expansion steam engines delivering 27218 kW (36,500 ihp) to three shafts
Speed: 23 kts
Armament: 14 194-mm (7.64-in) and 14 65-mm (2.56-in) guns, and two 450-mm (17.72-in) torpedo tubes
Armour: belt 170 mm (6.69 in) tapering to 90 mm (3.54 in); upper protective deck 35 mm (1.38 in); lower protective deck 130 mm (5.12 in); transverse bulkhead 130 mm (5.12 in); barbettes 150 mm (5.91 in); casemates 120 mm (4.72 in)
Complement: 840



Above: Waldeck Rousseau ***lies peacefully at anchor off Algiers. Although fine cruisers, the class was rendered obsolete by the new battle-cruisers.***

Below: Waldeck Rousseau ***broke with French tradition by adopting a uniform armament of 14 194-mm (7.6-in) guns instead of the usual combination.***



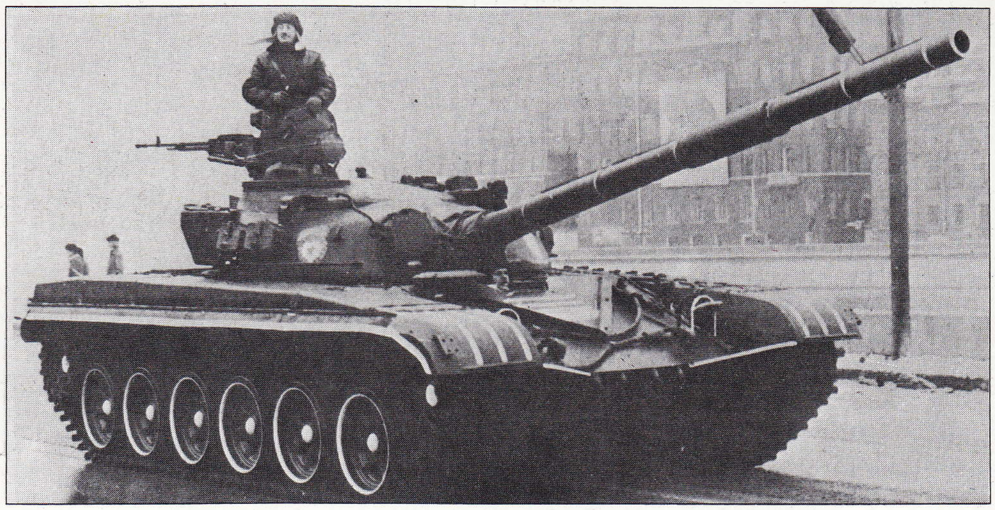


Although the 'Waldeck Rousseaus' could bring nine guns to bear on either beam, their broadside was inferior to that of the British 'Minotaurs'.

Soviet Army

Part 4

The Soviet army has 208 divisions, but in peace not all of these are maintained at full personnel strength as to do so would put an undue burden on the Soviet economy. The divisions are thus classified as being at one of three readiness categories (Category 1, Category 2 and Category 3). Category 1 divisions have a strength of between 75 and 100 per cent in both men and equipment, those divisions in key areas such as East Germany being up to full strength at all times. Those divisions within the Soviet Union and not earmarked for early deployment probably have most of their equipment but need reservists to bring them up to full strength for military operations. Category 2 divisions have a personnel strength of between 50 and 75 per cent and most of their equipment (much of it in storage), and it is estimated that these divisions could not be ready for deployment until after 30 days of mobilization. Category 3 divisions have a personnel strength of between 10 and 33 per cent and an equipment strength of between 35 and 50 per cent, the majority of this latter in storage. It is estimated that these divisions would not be ready for effective military operations until 80 to 120 days after mobilization, although if two Category 3 divisions were merged into one this could be reduced to perhaps 60 days.



The T-72 is fitted with a new type of composite protection, apparently similar to the Chobham armour of the British Challenger and the US M1 Abrams, but without its characteristic flat surfaces. Its 125-mm gun can penetrate 475 mm of armour firing HEAT and 300 mm of armour at 1 km (0.6 miles) with APFSDS.

Deployment of Soviet Ground Forces

Group of Soviet Forces in Germany (GSFG)
(all Category 1)

Headquarters	Zossen-Wünstorf
34th Gun Artillery Division	Dazu, Potsdam
1st Guards Tank Army	Dresden
6th Guards Tank Division	Lutherstadt-Wittenberg
7th Guards Tank Division	Dessau-Rosslau
9th Tank Division	Riesa, Sachsen-Zeithain
11th Guards Tank Division	Dresden-Klotzsche
27th Guards Motorized Rifle Division	Halle
2nd Guards Tank Army	Fürstenberg
16th Guards Tank Division	Neustrelitz
21st Motorized Rifle Division	Perleberg/Prignitz
25th Tank Division	Vogelsang-Berlin
94th Guards Motorized Rifle Division	Schwerin
3rd Shock Army	Magdeburgh
10th Guards Tank Division	Krampnnitz, Potsdam
12th Guards Tank Division	Neuruppin
47th Guards Tank Division	Hillersleben, Altmark
207th Guards Motorized Rifle Division	Stendal, Altmark
8th Guards Army	Weimar-Noha
79th Guards Tank Division	Jena
20th Guards Motorized Rifle Division	Grimma
39th Guards Motorized Rifle Division	Ohrdruf
57th Guards Motorized Rifle Division	Naumberg-Saale
20th Guards Army	Eberswalde
6th Guards Motorized Rifle Division	Bernau
14th Guards Motorized Rifle Division	Jüterbog
35th Motorized Rifle Division	Döberitz

Soviet Northern Group of Forces (Poland)
(all Category 1)

Headquarters	Legnica
20th Tank Division	Borne
38th Tank Division	Swietoszow

Soviet Southern Group of Forces (Hungary)
(all Category 1)

Headquarters	Budapest-Matyasfold
2nd Tank Division	Esztergom
5th Tank Division	Veszprem
102nd Guards Motorized Rifle Division	Szekesfehervar
35th Guards Motorized Rifle Division	Kecskemet

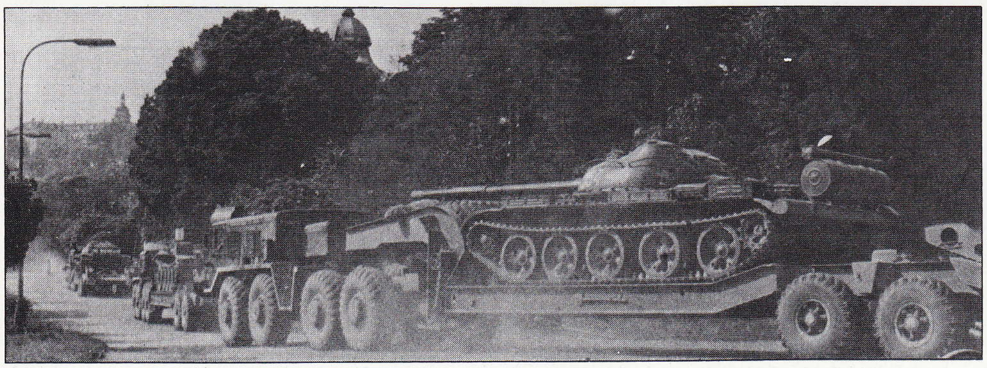
Soviet Central Group of Forces (Czechoslovakia)
(all Category 1)

Headquarters	Milovice, Prague
10th Tank Division	Milovice
31st Tank Division	Bruntal
66th Guards Motorized Rifle Division	Zvolen
55th Guards Motorized Rifle Division	Vysoke Myto
16th Guards Motorized Rifle Division	Mlada Boleslav

Baltic Military District (committed to Central Europe, Category 2 & 3)
HQ 11th Guards Army at Kaliningrad
- 3 tank divisions
- 6 motorized rifle divisions
- 2 airborne divisions
- 2 artillery divisions

Belorussian Military District (committed to Central Europe, Category 1, 2 & 3)
HQ 5th Guards Tank Army at Bobruysk, HQ 7th Guards Tank Army at Borisov, and HQ 28th Army at Grodno
- 9 tank divisions
- 3 motorized rifle divisions
- 1 airborne division
- 1 artillery division

Carpathian Military District (committed to Central Europe, Category 1, 2 & 3)
HQ 8th Guards Tank Army at Zhitomir, HQ 13th Army at Rovno, and HQ 38th Army at Ivano-Frankovsk
- 3 tank divisions
- 9 motorized rifle divisions
- 1 artillery division



Able to haul loads of 75 tonnes, these MAZ 537 tractors can easily cope with 40 tonnes of T-62. Tanks usually travel long distances this way, or by rail, as to do so on their own tracks causes maintenance problems for both vehicles and road surfaces.

12 PASS

Kiev Military District (committed to Central Europe, Category 2 & 3)
HQ 1st Guards Tank Army at Chernigov, and HQ Tank Army at Dnepropetrovsk
  6 tank divisions
  4 motorized rifle divisions
  1 artillery division

Leningrad Military District (committed to Northern Europe, Category 1, 2 & 3)
Army HQ
two corps HQ
  8 motorized rifle divisions
  1 airborne division
  1 artillery division

Moscow Military District (committed to Central Europe, Category 1, 2 & 3)
  2 tank divisions
  4 motorized rifle divisions
  1 airborne division

Odessa Military District (committed to Southern Europe, Category 2 & 3)
HQ 19th Army at Kishinev
  6 motorized rifle divisions
  1 airborne division
  1 artillery division

Ural Military District (Strategic Reserve, Category 2 & 3)
HQ at Sverdlovsk
  2 motorized rifle divisions
  1 tank division

Volga Military District (Strategic Reserve, Category 3)
HQ at Kuybyshev
  3 motorized rifle divisions

North Caucasus Military District (committed to Southern Front, Category 2 & 3)
HQ at Rostov
2 Corps HQs
1 tank division
6 motorized rifle divisions
1 artillery division

Trans-Caucasus Military District (committed to Southern Front, Category 2 & 3)
HQ at Tbilisi, HQ 76th Guards Army at Yerevan, HQ 4th Army at Baku, and HQ 45th Army at Kutaisi
  11 motorized rifle divisions
  1 airborne division
  1 artillery division

Turkestan Military District (committed to Southern Front, Category 2 & 3)
HQ at Tashkent
  5 motorized rifle divisions
  1 artillery division

Central Asian Military District (committed against China, Category 1, 2 & 3)
HQ at Alma Ata
  1 tank division
  6 motorized rifle divisions

Siberian Military District (committed against China, Category 2 & 3)
HQ at Novosibirsk
  5 motorized rifle divisions

Transbaykal Military District (committed against China, Category 1, 2 & 3)
HQ at Chita
  2 tank divisions
  7 motorized rifle divisions
  1 artillery division

Far Eastern Military District (committed against China, Category 1, 2 & 3)
HQ at Chabarsoyil
3 army HQs plus Corps HQ
  21 motorized rifle divisions
  1 tank division
  2 artillery divisions

Mongolia Military Division (committed against China, Category 1, 2 & 3)
HQ at Ulan Bator
  2 tank divisions
  2 motorized rifle divisions

Soviet Army units overseas

Soviet army training teams and advisers can be found in many countries including, Algeria, Angola, Cuba, Ethiopia, Iraq, Kampuchea, Laos, Libya, Mali, Mozambique, Syria and Vietnam to name but a few. In Afghanistan are three motorized rifle and one air assault divisions plus many smaller units.

Manpower

It is estimated that the Soviet army has a peacetime strength of about 1,800,000 officers and men, of whom 1,400,000 are conscripts. Some 25 million officers and men are available on full mobilization for all arms (land, sea and air), of which some 5 million have undertaken military service in the last two years.

Twice a year the local district military commissariat calls up its quota of recruits who eventually end up at specific units designated by the military district military headquarters. They then undergo a four-week intensive initial military training period, after which each recruit takes the soldier's oath of allegiance. Once this four-week training has been completed recruits are posted to their operational unit where training is completed. The yearly training programme includes a winter period starting on 1 December and a summer period commencing on 2 May.

It should be noted that all Soviet airborne/air assault divisions are Category 1 formations. These come under direct control of the high command in Moscow as distinct from the command structure of the military districts in which they are located. Actual numbers of divisions stationed in European military districts are fairly accurate, but those in others are provisional.

Despite steadily narrowing the technological gap between Soviet and Western combat vehicles, the USSR still strives to maintain its colossal numerical superiority. It is estimated that the Red Army will have at least 30,000 T-64/72 tanks in service by 1987.